ATTACHMENT 3

LIMERICK GENERATING STATION

Docket Nos. 50-352
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PROPOSED TECHNICAL SPECIFICATIONS CHANGES

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No changes have been made to this page.

BASES

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the reactor protection system instrumentation channels shown in Table 3.3.1-1 shall be OPERABLE with the REACTOR PROTECTION SYSTEM RESPONSE TIME as shown in Table 3.3.1-2.

APPLICABILITY: As shown in Table 3.3.1-1.

ACTION:

a. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for one trip system, place the inoperable channel(s) and/or that trip system in the tripped condition* within 12 hours. The provisions of Specification 3.0.4 are not applicable.

b. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for both trip systems, place at least one trip system** in the tripped condition within 1 hour and take the ACTION required by Table 3.3.1-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each reactor protection system instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.1.1-1.

4.3.1.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

4.3.1.3 The REACTOR PROTECTION SYSTEM RESPONSE TIME of each reactor trip functional unit shown in Table 3.3.1-2 shall be demonstrated to be within its limit at least once per 18 months. Each test shall include at least one channel per trip system such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip system.

* An inoperable channel need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, the inoperable channel shall be restored to OPERABLE status within 6 hours or the ACTION required by Table 3.3.1-1 for that Trip Function shall be taken.

**The trip system need not be placed in the tripped condition if this would cause the Trip Function to occur. When a trip system can be placed in the tripped condition without causing the Trip Function to occur, place the trip system with the most inoperable channels in the tripped condition; if both systems have the same number of inoperable channels, place either trip system in the tripped condition.

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 6 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) This function shall be automatically bypassed when the reactor mode switch is in the Run position and the associated APRM is not downscale.

(c) 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 performed per Specification 3.10.3.

(d) The noncoincident NMS reactor trip function logic is such that all channels go to both trip systems. Therefore, when the "shorting links" are removed, the Minimum OPERABLE Channels Per Trip System is 4 APRMs, 6 IRMs and 2 SRMs.

(e) 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.

(f) This function is not required to be OPERABLE when the reactor pressure vessel head is removed per Specification 3.10.1.

(g) This function shall be automatically bypassed when the reactor mode switch is not in the Run position.

(h) This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required.

(i) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

(j) This function shall be automatically bypassed when turbine first stage pressure is equivalent to a THERMAL POWER of less than 30% of RATED THERMAL POWER.

(k) Also actuates the EOC-RPT system.

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

TABLE 4.3.1.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

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

TABLE 4.3.1.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED	
8. Scram Discharge Volume Water Level - High					
a. Level Transmitter	S	Q	R	1, 2, 5(i)	
b. Float Switch	N.A.	Q	R	1, 2, 5(i)	
9. Turbine Stop Valve - Closure	N.A.	Q	R	1	
10. Turbine Control Valve Fast Closure, Trip Oil Pressure - Low	N.A.	Q	R	1	
11. Reactor Mode Switch Shutdown Position	N.A.	R	N.A.	1, 2, 3, 4, 5	
12. Manual Scram	N.A.	W	N.A.	1, 2, 3, 4, 5	

(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 decades during each startup after entering OPERATIONAL CONDITION 2 and the IRM and APRM channels shall be determined to overlap for a least 1/2 decades 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) Verify measured core flow (total core flow) to be greater than or equal to established core flow at the existing loop flow (APRM % flow). During the startup test program, data shall be recorded for the parameters listed to provide a basis for establishing the specified relationships. Comparisons of the actual data in accordance with the criteria listed shall commence upon the conclusion of the startup test program.
(h) This function is not required to be OPERABLE when the reactor pressure vessel head is removed per Specification 3.10.1.
(i) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.
(j) If the RPS shorting links are required to be removed per Specification 3.9.2, they may be reinstalled for up to 2 hours for required surveillance. During this time, CORE ALTERATIONS shall be suspended, and no control rod shall be moved from its existing position.

3/4.3.2 ISOLATION ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The isolation actuation instrumentation channels shown in Table 3.3.2-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.2-2 and with ISOLATION SYSTEM RESPONSE TIME as shown in Table 3.3.2-3.

APPLICABILITY: As shown in Table 3.3.2-1.

ACTION:

a. With an isolation actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.2-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for one trip system:

1. If placing the inoperable channels(s) in the tripped condition would cause an isolation, the inoperable channel(s) shall be restored to OPERABLE status within:

a) 2 hours for trip functions not common* to the Reactor Protection System (RPS) and/or Emergency Core Cooling System (ECCS) Actuation Instrumentation, or

b) 6 hours for trip functions common* to RPS and/or ECCS Actuation Instrumentation.

If this cannot be accomplished, the ACTION required by Table 3.3.2-1 for the affected trip function shall be taken, or the channel shall be placed in the tripped condition.

2. If placing the inoperable channel(s) in the tripped condition would not cause an isolation, the inoperable channel(s) and/or that trip system shall be placed in the tripped condition within:

a) 1 hour for trip functions not common* to the RPS and/or ECCS Actuation Instrumentation,

b) 12 hours for trip functions common* to RPS Instrumentation,

c) 24 hours for trip functions common* to ECCS Actuation Instrumentation,

and

d) 12 hours for trip functions common* to RPS and ECCS Actuation Instrumentation.

The provisions of Specification 3.0.4 are not applicable.

* Trip functions common to RPS and/or ECCS Actuation Instrumentation are shown in Table 4.3.2.1-1.

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

c. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for both trip systems, place at least one trip system** in the tripped condition within 1 hour and take the ACTION required by Table 3.3.2-1.

SURVEILLANCE REQUIREMENTS

4.3.2.1 Each isolation actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.2.1-1.

4.3.2.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

4.3.2.2 The ISOLATION SYSTEM RESPONSE TIME of each isolation trip function shown in Table 3.3.2-3 shall be demonstrated to be within its limit at least once per 18 months. Each test shall include at least once channel per trip system such that all channels are tested at least once every N times 18 months, where N is the total number of redundant channels in a specific isolation trip system.

** The trip system need not be placed in the tripped condition if this would cause the Trip Function to occur. When a trip system can be placed in the tripped condition without causing the Trip Function to occur, place the trip system with the most inoperable channels in the tripped condition; if both systems have the same number of inoperable channels, place either trip system in the tripped condition.

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 - Be in at least STARTUP within 6 hours.

ACTION 23 - In OPERATIONAL CONDITION 1 or 2, verify the affected system isolation valves are closed within 1 hour and declare the affected system inoperable. In OPERATIONAL CONDITION 3, be in at least COLD SHUTDOWN within 12 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 - Close the affected system isolation valves within 1 hour.

TABLE NOTATIONS

* Required when (1) handling irradiated fuel in the refueling area secondary containment, or (2) during CORE ALTERATIONS, or (3) during operations with a potential for draining the reactor vessel with the vessel head removed and fuel in the vessel.

** May be bypassed under administrative control, with all turbine stop valves closed.

\# During operation of the associated Unit 1 or Unit 2 ventilation exhaust system.

(a) See Specification 3.6.3, Table 3.6.3-1 for primary containment isolation valves which are actuated by these isolation signals.

(b) A channel may be placed in an inoperable status for up to:

a) 2 hours for trip functions not common the the Reactor Protection System (RPS) and/or Emergency Core Cooling System (ECCS) Actuation Instrumentation, or
b) 6 hours for trip functions common to RPS and/or ECCS Actuation Instrumentation

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. Trip functions common to RPS and/or ECCS Actuation Instrumentation are shown in Table 4.3.2.1-1. In addition, for the HPCI system and RCIC system isolation, provided that the redundant isolation valve, inboard or outboard, as applicable, in each line is OPERABLE and all required actuation instrumentation for that valve is OPERABLE, one channel may be placed in an inoperable status for up to 8 hours for required surveillance without placing the channel or trip system in the tripped condition.

TABLE NOTATIONS

(c) Actuates secondary containment isolation valves shown in Table 3.6.5.2.1-1 and/or 3.6.5.2.2-1 and signals B, H, S, U, R and T also start the standby gas treatment system.

(d) RWCU system inlet outboard isolation valve closes on SLCS "B" initiation. RWCU system inlet inboard isolation valve closes on SLCS "A" or SLCS "C" initiation.

(e) Manual initiation isolates the steam supply line outboard isolation valve and only following manual or automatic initiation of the system.

(f) In the event of a loss of ventilation the temperature - high setpoint may be raised by $50^{o}F$ for a period not to exceed 30 minutes to permit restoration of the ventilation flow without a spurious trip. During the 30 minute period, an operator, or other qualified member of the technical staff, shall observe the temperature indications continuously, so that, in the event of rapid increases in temperature, the main steam lines shall be manually isolated.

(g) Wide range accident monitor per Specification 3.3.7.5.

TABLE 4.3.2.1-1

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
1. MAIN STEAM LINE ISOLATION				
a. Reactor Vessel Water Level[##]				
1) Low, Low, Level 2	S	Q	R	1, 2, 3
2) Low, Low, Low - Level 1	S	Q	R	1, 2, 3
b. Main Steam Line Radiation[###] - High	S	Q	R	1, 2, 3
c. Main Steam Line Pressure - Low	S	M	R	1
d. Main Steam Line Flow - High	S	M	R	1, 2, 3
e. Condenser Vacuum - Low	S	M	R	1, 2**, 3**
f. Outboard MSIV Room Temperature - High	S	M	R	1, 2, 3
g. Turbine Enclosure - Main Steam Line Tunnel Temperature - High	S	M	R	1, 2, 3
h. Manual Initiation	N.A.	R	N.A.	1, 2, 3
2. RHR SYSTEM SHUTDOWN COOLING MODE ISOLATION				
a. Reactor Vessel Water Level[###] Low - Level 3	S	Q	R	1, 2, 3
b. Reactor Vessel (RHR Cut-In Permissive) Pressure[##] - High	S	Q	R	1, 2, 3
c. Manual Initiation	N.A.	R	N.A.	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 FOR WHICH SURVEILLANCE REQUIRED
3. REACTOR WATER CLEANUP SYSTEM ISOLATION				
a. RWCS Δ Flow - High	S	M	R	1, 2, 3
b. RWCS Area Temperature - High	S	M	R	1, 2, 3
c. RWCS Area Ventilation Δ Temperature - High	S	M	R	1, 2, 3
d. SLCS Initiation	N.A.	R	N.A.	1, 2, 3
e. Reactor Vessel Water Level[##] Low, Low, - Level 2	S	Q	R	1, 2, 3
f. Manual Initiation	N.A.	R	N.A.	1, 2, 3
4. HIGH PRESSURE COOLANT INJECTION SYSTEM ISOLATION				
a. HPCI Steam Line Δ Pressure - High	S	M	R	1, 2, 3
b. HPCI Steam Supply Pressure - Low	S	M	R	1, 2, 3
c. HPCI Turbine Exhaust Diaphragm Pressure - High	S	M	R	1, 2, 3
d. HPCI Equipment Room Temperature - High	S	M	R	1, 2, 3
e. HPCI Equipment Room Δ Temperature - High	S	M	R	1, 2, 3
f. HPCI Pipe Routing Area Temperature - High	S	M	R	1, 2, 3
g. Manual Initiation	N.A.	R	N.A.	1, 2, 3
h. HPCI Steam Line Δ Pressure Timer	N.A.	M	R	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 FOR WHICH SURVEILLANCE REQUIRED
5. REACTOR CORE ISOLATION COOLING SYSTEM ISOLATION				
a. Reactor Steam Line Δ Pressure - High	S	M	R	1, 2, 3
b RCIC Steam Supply Pressure - Low	S	M	R	1, 2, 3
c. RCIC Turbine Exhaust Diaphragm Pressure - High	S	M	R	1, 2, 3
d. RCIC Equipment Room Temperature - High	S	M	R	1, 2, 3
e. RCIC Equipment Room Δ Temperature - High	S	M	R	1, 2, 3
f. RCIC Pipe Routing Area Temperature - High	S	M	R	1, 2, 3
g. Manual Initiation	N.A.	R	N.A.	1, 2, 3
h. RCIC Steam Line Δ Pressure Timer	N.A.	M	R	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 FOR WHICH SURVEILLANCE REQUIRED
6. PRIMARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level##				
1) Low, Low - Level 2	S	Q	R	1, 2, 3
2) Low, Low, Low - Level 1	S	Q	R	1, 2, 3
b. Drywell Pressure### - High	S	Q	R	1, 2, 3
c. North Stack Effluent Radiation - High	S	Q	R	1, 2, 3
d. Deleted				
e. Reactor Enclosure Ventilation Exhaust Duct - Radiation - High	S	M	R	1, 2, 3
f. Outside Atmosphere to Reactor Enclosure Δ Pressure - Low	N.A.	M	Q	1, 2, 3
g. Deleted				
h. Drywell Pressure## - High/ Reactor Pressure## - Low	S	Q	R	1, 2, 3
i. Primary Containment Instrument Gas to Drywell Δ Pressure - Low	N.A.	M	Q	1, 2, 3
j. Manual Initiation	N.A.	R	N.A.	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 FOR WHICH SURVEILLANCE REQUIRED
7. SECONDARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level## Low, Low - Level 2	S	Q	R	1, 2, 3
b. Drywell Pressure### - High	S	Q	R	1, 2, 3
c. 1. Refueling Area Unit 1 Ventilation Exhaust Duct Radiation - High	S	M	R	*#
2. Refueling Area Unit 2 Ventilation Exhaust Duct Radiation - High	S	M	R	*#
d. Reactor Enclosure Ventilation Exhaust Duct Radiation - High	S	M	R	1, 2, 3
e. Outside Atmosphere To Reactor Enclosure Δ Pressure - Low	N.A.	M	Q	1, 2, 3
f. Outside Atmosphere To Refueling Area Δ Pressure - Low	N.A.	M	Q	*
g. Reactor Enclosure Manual Initiation	N.A.	R	N.A.	1, 2, 3
h. Refueling Area Manual Initiation	N.A.	R	N.A.	*

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

**When not administratively bypassed and/or when any turbine stop valve is open.

#During operation of the associated Unit 1 or Unit 2 ventilation exhaust system.

##These trip functions (1a, 2b, 3e, 6a, 6h, and 7a) are common to the ECCS actuation trip function.

###These trip functions (2a, 6b, and 7b) are common to the RPS and ECCS actuation trip functions.

####This trip function (1b) is common to the RPS trip function.

TABLE 3.3.3-1 (Continued)
EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION
TABLE NOTATIONS

(a) A channel may be placed in an inoperable status for up to 6 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) Also provides input to actuation logic for the associated emergency diesel generators.

(c) One trip system. Provides signal to HPCI pump suction valves only.

(d) On 1 out of 2 taken twice logic, provides a signal to trip the HPCI pump turbine only.

(e) The manual initiation push buttons start the respective core spray pump and diesel generator. The "A" and "B" logic manual push buttons also actuate an initiation permissive in the injection valve opening logic.

(f) A channel as used here is defined as the 127 bus relay for Item 1 and the 127, 127Y, and 127Z feeder relays with their associated time delay relays taken together for Item 2.

* When the system is required to be OPERABLE per Specification 3.5.2.

\# Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 100 psig.

** Required when ESF equipment is required to be OPERABLE.

\#\# Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 200 psig.

TABLE 3.3.3-1 (Continued)
EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION
ACTION STATEMENTS

ACTION 30 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. With one channel inoperable, place the inoperable channel in the tripped condition within 24 hours or declare the associated system inoperable.

b. With more than one channel inoperable, declare the associated system inoperable.

ACTION 31 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, declare the associated ECCS inoperable within 24 hours.

ACTION 32 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within 24 hours.

ACTION 33 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 24 hours or declare the associated ECCS inoperable.

ACTION 34 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. For one channel inoperable, place the inoperable channel in the tripped condition within 24 hours or declare the HPCI system inoperable.

b. With more than one channel inoperable, declare the HPCI system inoperable.

ACTION 35 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within 24 hours or declare the HPCI system inoperable.

ACTION 36 - With the number of OPERABLE channels less than the Total Number of Channels, declare the associated emergency diesel generator inoperable and take the ACTION required by Specification 3.8.1.1 or 3.8.1.2, as appropriate.

ACTION 37 - With the number of OPERABLE channels one less than the Total Number of Channels, place the inoperable channel in the tripped condition within 1 hour; operation may then continue until performance of the next required CHANNEL FUNCTIONAL TEST.

TABLE 4.3.3.1-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED	
1. CORE SPRAY SYSTEM					
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	Q	R	1, 2, 3, 4*, 5*	
b. Drywell Pressure - High	S	Q	R	1, 2, 3	
c. Reactor Vessel Pressure - Low	S	Q	R	1, 2, 3, 4*, 5*	
d. Manual Initiation	N.A.	R	N.A.	1, 2, 3, 4*, 5*	
2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM					
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	Q	R	1, 2, 3, 4*, 5*	
b. Drywell Pressure - High	S	Q	R	1, 2, 3	
c. Reactor Vessel Pressure - Low	S	Q	R	1, 2, 3	
d. Injection Valve Differential Pressure - Low (Permissive)	S	Q	R	1, 2, 3, 4*, 5*	
e. Manual Initiation	N.A.	R	N.A.	1, 2, 3, 4*, 5*	
3. HIGH PRESSURE COOLANT INJECTION SYSTEM***					
a. Reactor Vessel Water Level - Low Low, Level 2	S	Q	R	1, 2, 3	
b. Drywell Pressure - High	S	Q	R	1, 2, 3	
c. Condensate Storage Tank Level - Low	S	Q	R	1, 2, 3	
d. Suppression Pool Water Level - High	S	Q	R	1, 2, 3	
e. Reactor Vessel Water Level - High, Level 8	S	Q	R	1, 2, 3	
f. Manual Initiation	N.A.	R	N.A.	1, 2, 3	

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
4. AUTOMATIC DEPRESSURIZATION SYSTEM#				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	Q	R	1, 2, 3
b. Drywell Pressure - High	S	Q	R	1, 2, 3
c. ADS Timer	N.A.	Q	Q	1, 2, 3
d. Core Spray Pump Discharge Pressure - High	S	Q	R	1, 2, 3
e. RHR LPCI Mode Pump Discharge Pressure - High	S	Q	R	1, 2, 3
f. Reactor Vessel Water Level - Low, Level 3	S	Q	R	1, 2, 3
g. Manual Initiation	N.A.	R	N.A.	1, 2, 3
h. ADS Drywell Pressure Bypass Timer	N.A.	Q	Q	1, 2, 3
5. LOSS OF POWER				
a. 4.16 kV Emergency Bus Under-voltage (Loss of Voltage)##	N.A.	R	N.A.	1, 2, 3, 4**, 5**
b. 4.16 kV Emergency Bus Under-voltage (Degraded Voltage)	S	M	R	1, 2, 3, 4**, 5**

* When the system is required to be OPERABLE per Specification 3.5.2.

** Required OPERABLE when ESF equipment is required to be OPERABLE.

*** Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 200 psig.

Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 100 psig.

Loss of Voltage Relay 127-11X is not field setable.

LIMITING CONDITION FOR OPERATION

3.3.4.2 The end-of-cycle recirculation pump trip (EOC-RPT) system instrumentation channels shown in Table 3.3.4.2-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.4.2-2 and with the END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM RESPONSE TIME as shown in Table 3.3.4.2-3.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 30% of RATED THERMAL POWER.

ACTION:

a. With an end-of-cycle recirculation pump trip system instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.4.2-2, declare the channel inoperable until the channel is restored to OPERABLE status with the channel setpoint adjusted consistent with the Trip Setpoint value.

b. With the number of OPERABLE channels one less than required by the Minimum OPERABLE Channels per Trip System requirement for one or both trip systems, place the inoperable channel(s) in the tripped condition within 12 hours.

c. With the number of OPERABLE channels two or more less than required by the Minimum OPERABLE Channels per Trip System requirement for one trip system and:

   1. If the inoperable channels consist of one turbine control valve channel and one turbine stop valve channel, place both inoperable channels in the tripped condition within 1 hour.

   2. If the inoperable channels include two turbine control valve channels or two turbine stop valve channels, declare the trip system inoperable.

d. With one trip system inoperable, restore the inoperable trip system to OPERABLE status within 72 hours or take the ACTION required by Specification 3.2.3.

e. With both trip systems inoperable, restore at least one trip system to OPERABLE status within one hour or take the ACTION required by Specification 3.2.3.

TABLE 3.3.4.2-1

END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM*
1. Turbine Stop Valve - Closure	2**
2. Turbine Control Valve-Fast Closure	2**

*A trip system may be placed in an inoperable status for up to 6 hours for required suveillance provided that the other trip system is OPERABLE.

**This function shall be automatically bypassed when turbine first stage pressure is equivalent to THERMAL POWER less than 30% of RATED THERMAL POWER.

TABLE 4.3.4.2.1-1

END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION
1. Turbine Stop Valve - Closure	Q*	R
2. Turbine Control Valve-Fast Closure	Q*	R

*Including trip system logic testing.

TABLE 3.3.5-1

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

FUNCTIONAL UNITS	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION*	ACTION
a. Reactor Vessel Water Level - Low Low, Level 2	4#	50
b. Reactor Vessel Water Level - High, Level 8	4#	51
c. Condensate Storage Tank Water Level - Low	2**	52
d. Manual Initiation	1/system***	53

*A channel may be placed in an inoperable status for up to 6 hours for required surveillance without placing the trip system in the tripped condition provided all other channels monitoring that parameter are OPERABLE.

**One trip system with one-out-of-two logic.

***One trip system with one channel.

#One trip system with one-out-of-two twice logic.

TABLE 3.3.5-1 (Continued)

REACTOR CORE ISOLATION COOLING SYSTEM
ACTION STATEMENTS

ACTION 50 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. With one channel inoperable, place the inoperable channel in the tripped condition within 24 hours or declare the RCIC system inoperable. |

b. With more than one channel inoperable, declare the RCIC system inoperable.

ACTION 51 - With the number of OPERABLE channels less than required by the minimum OPERABLE channels per Trip System requirement, declare the RCIC system inoperable within 24 hours. |

ACTION 52 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, place at least one inoperable channel in the tripped condition within 24 hours or declare the RCIC system inoperable. |

ACTION 53 - With the number of OPERABLE channels one less than required by the Minimum OPERABLE Channels per Trip System requirement, restore the inoperable channel to OPERABLE status within 24 hours or declare the RCIC system inoperable. |

TABLE 4.3.5.1-1

REACTOR CORE ISOLATION SYSTEM ACTUATION INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNITS	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	
a. Reactor Vessel Water Level - Low Low, Level 2	S	Q	R	I
b. Reactor Vessel Water Level - High, Level 8	S	Q	R	I
c. Condensate Storage Tank Level - Low	S	Q	R	I
d. Manual Initiation	N.A.	R	N.A.	

TABLE 4.3.6-1

CONTROL ROD BLOCK INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION[a]	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
1. ROD BLOCK MONITOR				
a. Upscale	N.A.	S/U[b][c],Q[c]	SA	1*
b. Inoperative	N.A.	S/U[b][c],Q[c]	N.A.	1*
c. Downscale	N.A.	S/U[b][c],Q[c]	SA	1*
2. APRM				
a. Flow Biased Neutron Flux - Upscale	N.A.	S/U[b],Q	SA	1
b. Inoperative	N.A.	S/U[b],Q	N.A.	1, 2, 5
c. Downscale	N.A.	S/U[b],Q	SA	1
d. Neutron Flux - Upscale, Startup	N.A.	S/U[b],Q	SA	2, 5
3. SOURCE RANGE MONITORS				
a. Detector not full in	N.A.	S/U[b],W	N.A.	2, 5
b. Upscale	N.A.	S/U[b],W	SA	2, 5
c. Inoperative	N.A.	S/U[b],W	N.A.	2, 5
d. Downscale	N.A.	S/U[b],W	SA	2, 5
4. INTERMEDIATE RANGE MONITORS				
a. Detector not full in	N.A.	S/U[b],W	N.A.	2, 5
b. Upscale	N.A.	S/U[b],W	SA	2, 5
c. Inoperative	N.A.	S/U[b],W	N.A.	2, 5
d. Downscale	N.A.	S/U[b],W	SA	2, 5
5. SCRAM DISCHARGE VOLUME				
a. Water Level-High	N.A.	Q	R	1, 2, 5**
6. REACTOR COOLANT SYSTEM RECIRCULATION FLOW				
a. Upscale	N.A.	S/U[b],Q	SA	1
b. Inoperative	N.A.	S/U[b],Q	N.A.	1
c. Comparator	N.A.	S/U[b],Q	SA	1
7. REACTOR MODE SWITCH SHUTDOWN POSITION	N.A.	R	N.A.	3, 4

BASES

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

The reactor protection system automatically initiates a reactor scram to:

a. Preserve the integrity of the fuel cladding.

b. Preserve the integrity of the reactor coolant system.

c. Minimize the energy which must be absorbed following a loss-of-coolant accident, and

d. Prevent inadvertent criticality.

This specification provides the limiting conditions for operation necessary to preserve the ability of the system to perform its intended function even during periods when instrument channels may be out of service because of maintenance. When necessary, one channel may be made inoperable for brief intervals to conduct required surveillance.

The reactor protection system is made up of two independent trip systems. There are usually four channels to monitor each parameter with two channels in each trip system. The outputs of the channels in a trip system are combined in a logic so that either channel will trip that trip system. The tripping of both trip systems will produce a reactor scram. The system meets the intent of IEEE-279 for nuclear power plant protection systems. Specified surveillance intervals and surveillance and maintenance outage times have been determined in accordance with NEDC-30851P, "Technical Specification Improvement Analyses for BWR Reactor Protection System," as approved by the NRC and documented in the NRC Safety Evaluation Report (SER) (letter to T. A. Pickens from A. Thadani dated July 15, 1987. The bases for the trip settings of RPS are discussed in the bases for Specification 2.2.1.

The measurement of response time at the specified frequencies provides assurance that the protective functions associated with each channel are completed within the time limit assumed in the safety analyses. No credit was taken for those channels with response times indicated as not applicable. Response time may be demonstrated by any series of sequential, overlapping or total channel test measurement, provided such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by either (1) inplace, onsite or offsite test measurements, or (2) utilizing replacement sensors with certified response times.

3/4.3.2 ISOLATION ACTUATION INSTRUMENTATION

This specification ensures the effectiveness of the instrumentation used to mitigate the consequences of accidents by prescribing the OPERABILITY trip setpoints and response times for isolation of the reactor systems. When necessary, one channel may be inoperable for brief intervals to conduct required surveillance.

Specified surveillance intervals and maintenance outage times have been determined in accordance with NEDC-30851P, Supplement 2, "Technical Specification Improvement Analysis for BWR Instrumentation Common to RPS and ECCS Instrumentation," as approved by the NRC and documented in the NRC Safety Evaluation Report (SER) (letter to D. N. Grace from C. E. Rossi dated January 6, 1989).

Some of the trip settings may have tolerances explicitly stated where both the high and low values are critical and may have a substantial effect on safety. The setpoints of other instrumentation, where only the high or low end of the setting have a direct bearing on safety, are established at a level away from the normal operating range to prevent inadvertent actuation of the systems involved.

Except for the MSIVs, the safety analysis does not address individual sensor response times or the response times of the logic systems to which the sensors are connected. For D.C. operated valves, a 3 second delay is assumed before the valve starts to move. For A.C. operated valves, it is assumed that the A.C. power supply is lost and is restored by startup of the emergency diesel generators. In this event, a time of 13 seconds is assumed before the valve starts to move. In addition to the pipe break, the failure of the D.C. operated valve is assumed; thus the signal delay (sensor response) is concurrent with the 10-second diesel startup and the 3 second load center loading delay. The safety analysis considers an allowable inventory loss in each case which in turn determines the valve speed in conjunction with the 13-second delay. It follows that checking the valve speeds and the 13-second time for emergency power establishment will establish the response time for the isolation functions.

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is an allowance for instrument drift specifically allocated for each trip in the safety analyses.

3/4.3.3 EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

The emergency core cooling system actuation instrumentation is provided to initiate actions to mitigate the consequences of accidents that are beyond the ability of the operator to control. This specification provides the OPERABILITY requirements, trip setpoints and response times that will ensure effectiveness of the systems to provide the design protection. Although the instruments are listed by system, in some cases the same instrument may be used to send the actuation signal to more than one system at the same time.

Specified surveillance intervals and maintenance outage times have been determined in accordance with NEDC-30936P, Parts 1 and 2, "Technical Speicification Improvement Methodology (with Demonstration for BWR ECCS

3/4.3.3 EMERGENCY CORE COOLING ACTUATION INSTRUMENTATION (Continued)

Actuation Instrumentation)" as approved by the NRC and documented in the SER (letter to D. N. Grace from A. C. Thadani dated December 9, 1988 (Part 1) and letter to D. N. Grace from C. E. Rossi dated December 9, 1988 (Part 2)).

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is an allowance for instrument drift specifically allocated for each trip in the safety analyses.

3/4.3.4 RECIRCULATION PUMP TRIP ACTUATION INSTRUMENTATION

The anticipated transient without scram (ATWS) recirculation pump trip system provides a means of limiting the consequences of the unlikely occurrence of a failure to scram during an anticipated transient. The response of the plant to this postulated event falls within the envelope of study events in General Electric Company Topical Report NEDO-10349, dated March 1971, NEDO-24222, dated December 1979, and Section 15.8 of the FSAR.

The end-of-cycle recirculation pump trip (EOC-RPT) system is a supplement to the reactor trip. During turbine trip and generator load rejection events, the EOC-RPT with reduce the likelihood of reactor vessel level decreasing to level 2. Each EOC-RPT system trips both recirculation pumps, reducing coolant flow in order to reduce the void collapse in the core during two of the most limiting pressurization events. The two events for which the EOC-RPT protective feature will function are closure of the turbine stop valves and fast closure of the turbine control valves.

A fast closure sensor from each of two turbine control valves provides input to the EOC-RPT system; a fast closure sensor from each of the other two turbine control valves provides input to the second EOC-RPT system. Similarly, a position switch for each of two turbine stop valves provides input to one EOC-RPT system; a position switch from each of the other two stop valves provides input to the other EOC-RPT system. For each EOC-RPT system, the sensor relay contacts are arranged to form a 2-out-of-2 logic for the fast closure of turbine control valves and a 2-out-of-2 logic for the turbine stop valves. The operation of either logic will actuate the EOC-RPT system and trip both recirculation pumps.

Specified surveillance intervals and maintenance outage times have been specified to correspond with the equivalent times in Table 4.3.1, since the initiating instrumentation is identical. This was concurred by GE via their letter to the BWR Owner's Group dated December 22, 1989, SUBJECT: "Clarification of Limerick 182 Proposed Technical Specification Changes Common to RPS or ECCS Actuation Instrumentation."

Each EOC-RPT system may be manually bypassed by use of a keyswitch which is administratively controlled. The manual bypasses and the automatic Operating Bypass at less than 30% of RATED THERMAL POWER are annunciated in the control room.

The EOC-RPT system response time is the time assumed in the analysis between initiation of valve motion and complete suppression of the electric arc, i.e., 175 ms. Included in this time are: the response time of the sensor, the time allotted for breaker arc suppression, and the response time of the system logic.

3/4.3.4 RECIRCULATION PUMP TRIP ACTUATION INSTRUMENTATION (Continued)

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is an allowance for instrument drift specifically allocated for each trip in the safety analyses.

3/4.3.5 REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

The reactor core isolation cooling system actuation instrumentation is provided to initiate actions to assure adequate core cooling in the event of reactor isolation from its primary heat sink and the loss of feedwater flow to the reactor vessel. This instrumentation does not provide actuation of any of the emergency core cooling equipment.

Specified surveillance intervals and maintenance outage times have been specified in accordance with recommendations made by GE in their letter to the BWR Owner's Group dated August 7, 1989. SUBJECT: "Clarification of Technical Specification changes given in ECCS Actuation Instrumentation Analysis."

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is an allowance for instrument drift specifically allocated for each trip in the safety analyses.

3/4.3.6 CONTROL ROD BLOCK INSTRUMENTATION

The control rod block functions are provided consistent with the requirements of the specifications in Section 3/4.1.4, Control Rod Program Controls and Section 3/4.2 Power Distribution Limits and Section 3/4.3 Instrumentation. The trip logic is arranged so that a trip in any one of the inputs will result in a control rod block.

Specified surveillance intervals and maintenance outage times have been determined in accordance with NEDC-30851P, Supplement 1, "Technical Specification Improvement Analysis for BWR Control Rod Block Instrumentation" as approved by the NRC and documented in the SER (letter to D. N. Grace from C. E. Rossi dated September 22, 1988).

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is an allowance for instrument drift specifically allocated for each trip in the safety analyses.

3/4.3.7 MONITORING INSTRUMENTATION

3/4.3.7.1 RADIATION MONITORING INSTRUMENTATION

The OPERABILITY of the radiation monitoring instrumentation ensures that: (1) the radiation levels are continually measured in the areas served by the individual channels, and (2) the alarm or automatic action is initiated when the radiation level trip setpoint is exceeded; and (3) sufficient information is available on selected plant parameters to monitor and assess these variables following an accident. This capability is consistent with 10 CFR Part 50, Appendix A, General Design Criteria 19, 41, 60, 61, 63, and 64.

3.4.3.7.2 SEISMIC MONITORING INSTRUMENTATION

The OPERABILITY of the seismic monitoring instrumentation ensures that sufficient capability is available to promptly determine the magnitude of a seismic event and evaluate the response of those features important to safety. This capability is required to permit comparison of the measured response to that used in the design basis for the unit.

3/4.3.7.3 METEOROLOGICAL MONITORING INSTRUMENTATION

The OPERABILITY of the meteorological monitoring instrumentation ensures that sufficient meteorological data is available for estimating potential radiation doses to the public as a result of a routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the need for initiating protective measures to protect the health and safety of the public. This instrumentation is consistent with the recommendations of Regulatory Guide 1.23 "Onsite Meteorological Programs," February, 1972.

Site data compiled since January 1972 provide correlation between Elevation 1 (Tower 1) and Elevation 1 (Tower 2), and between Elevation 2 (Tower 1) and Elevation 2 (Tower 2). This correlation serves as justification for the use of the appropriate Tower 2 instrument as a back-up to the Tower 1 instrument as shown in Table 3.3.7.3-1.

3/4.3.7.4 REMOTE SHUTDOWN SYSTEM INSTRUMENTATION AND CONTROLS

The OPERABILITY of the remote shutdown system instrumentation and controls ensures that sufficient capability is available to permit shutdown and maintenance of HOT SHUTDOWN of the unit from locations outside of the control room. This capability is required in the event control room habitability is lost and is consistent with General Design Criterion 19 of 10 CFR Part 50, Appendix A.

3/4.3.7.5 ACCIDENT MONITORING INSTRUMENTATION

The OPERABILITY of the accident monitoring instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess important variables following an accident. This capability is consistent with the recommendations of Regulatory Guide 1.97, "Instrumentation for Light Water Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident", December 1975 and NUREG-0737, "Clarification of TMI Action Plan Requirements", November 1980.

3/4.3.7.6 SOURCE RANGE MONITORS

The source range monitors provide the operator with information of the status of the neutron level in the core at very low power levels during startup and shutdown. At these power levels, reactivity additions shall not be made without this flux level information available to the operator. When the intermediate range monitors are on scale, adequate information is available without the SRMs and they can be retracted.

3/4.3.7.7 TRAVERSING IN-CORE PROBE SYSTEM

The OPERABILITY of the traversing in-core probe system with the specified minimum complement of equipment ensures that the measurements obtained from use of this equipement accurately represent the spatial neutron flux distribution of the reactor core.

The TIP system OPERABILITY is demonstrated by normalizing all probes (i.e., detectors) prior to performing an LPRM calibration function. Monitoring core thermal limits may involve utilizing individual detectors to monitor selected areas of the reactor core, thus all detectors to be used OPERABLE. The OPERABILITY of individual detectors to be used for monitoring is demonstrated by comparing the detector(s) output in the resultant heat balance calculation (P-1) with data obtained during a previous heat balance calculation (P-1).

3/4.3.7.8 CHLORINE AND TOXIC GAS DETECTION SYSTEMS

The OPERABILITY of the chlorine and toxic gas detection systems ensures that an accidental chlorine and/or toxic gas release will be detected promptly and the necessary protective actions will be automatically initiated for chlorine and manually initiated for toxic gas to provide protection for control room personnel. Upon detection of a high concentration of chlorine, the control room emergency ventilation system will automatically be placed in the chlorine isolation mode of operation to provide the required protection. Upon detection of a high concentration of toxic gas, the control room emergency ventilation system will manually be placed in the chlorine isolation mode of operation to provide the required protection. The detection systems required by this specification are consistent with the recommendations of Regulatory Guide 1.95 "Protection of Nuclear Power Plant Control Room Operators against an Accidental Chlorine Release", February 1975.

3/4.3.7.9 FIRE DETECTION INSTRUMENTATION

OPERABILITY of the detection instrumentation ensures that both adequate warning capability is available for prompt detection of fires and that fire suppression systems, that are actuated by fire detectors, will discharge extinguishing agent in a timely manner. Prompt detection and suppression of fires will reduce the potential for damage to safety-related equipment and is an integral element in the overall facility fire protection program.

Fire detectors that are used to actuate fire suppression systems represent a more critically important component of a plant's fire protection program than detectors that are installed solely for early fire warning and notification. Consequently, the minimum number of OPERABLE fire detectors must be greater.

The loss of detection capability for fire suppression systems, actuated by fire detectors, represents a significant degradation of fire protection for any area. As a result, the establishment of a fire watch patrol must be initiated at an earlier stage than would be warranted for the loss of detectors that provide only early fire warning. The establishment of frequent fire patrols in the affected areas is required to provide detection capability until the inoperable instrumentation is restored to OPERABILITY.

3/4.3.7.10 LOOSE-PART DETECTION SYSTEM

The OPERABILITY of the loose-part detection system ensures that sufficient capability is available to detect loose metallic parts in the primary system to avoid or mitigate damage to primary system components. The allowable out-of-service times and surveillance requirements are consistent with the recommendations of Regulatory Guide 1.133, "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors", May 1981.

3/4.3.7.11 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60,63, and 64 of Appendix A to 10 CFR Part 50.

3/4.3.7.12 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. This instrumentation also includes provisions for monitoring the concentrations of potentially explosive gas mixtures in the off-gas system. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

3/4.3.8 TURBINE OVERSPEED PROTECTION SYSTEM

This specification is provided to ensure that the turbine overspeed protection system instrumentation and the turbine speed control valves are OPERABLE and will protect the turbine from excessive overspeed. Protection from turbine excessive overspeed is required since excessive overspeed of the turbine could generate potentially damaging missiles which could impact and damage safety related components, equipment or structures.

3/4.3.9 FEEDWATER/MAIN TURBINE TRIP SYSTEM ACTUATION INSTRUMENTATION

The feedwater/main turbine trip system actuation instrumentation is provided to initiate action of the feedwater system/main turbine trip system in the event of failure of feedwater controller under maximum demand.

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the reactor protection system instrumentation channels shown in Table 3.3.1-1 shall be OPERABLE with the REACTOR PROTECTION SYSTEM RESPONSE TIME as shown in Table 3.3.1-2.

APPLICABILITY: As shown in Table 3.3.1-1.

ACTION:

a. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for one trip system, place the inoperable channel(s) and/or that trip system in the tripped condition* within 12 hours. The provisions of Specification 3.0.4 are not applicable.

b. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for both trip systems, place at least one trip system** in the tripped condition within 1 hour and take the ACTION required by Table 3.3.1-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each reactor protection system instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.1.1-1.

4.3.1.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

4.3.1.3 The REACTOR PROTECTION SYSTEM RESPONSE TIME of each reactor trip functional unit shown in Table 3.3.1-2 shall be demonstrated to be within its limit at least once per 18 months. Each test shall include at least one channel per trip system such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip system.

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* An inoperable channel need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, the inoperable channel shall be restored to OPERABLE status within 6 hours or the ACTION required by Table 3.3.1-1 for that Trip Function shall be taken.

**The trip system need not be placed in the tripped condition if this would cause the Trip Function to occur. When a trip system can be placed in the tripped condition without causing the Trip Function to occur, place the trip system with the most inoperable channels in the tripped condition; if both systems have the same number of inoperable channels, place either trip system in the tripped condition.

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 6 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) This function shall be automatically bypassed when the reactor mode switch is in the Run position and the associated APRM is not downscale.

(c) 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 performed per Specification 3.10.3.

(d) The noncoincident NMS reactor trip function logic is such that all channels go to both trip systems. Therefore, when the "shorting links" are removed, the Minimum OPERABLE Channels Per Trip System is 4 APRMs, 6 IRMs and 2 SRMs.

(e) 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.

(f) This function is not required to be OPERABLE when the reactor pressure vessel head is removed per Specification 3.10.1.

(g) This function shall be automatically bypassed when the reactor mode switch is not in the Run position.

(h) This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required.

(i) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

(j) This function shall be automatically bypassed when turbine first stage pressure is equivalent to a THERMAL POWER of less than 30% of RATED THERMAL POWER.

(k) Also actuates the EOC-RPT system.

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

TABLE 4.3.1.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION[a]	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
1. Intermediate Range Monitors:				
a. Neutron Flux - High	S/U,S(b)	S/U(c), W	R	2
	S	W(j)	R	3, 4, 5
b. Inoperative	N.A.	W(j)	N.A.	2, 3, 4, 5
2. Average Power Range Monitor[f]:				
a. Neutron Flux - Upscale, Setdown	S/U,S(b)	S/U(c), W	SA	2
	S	W(j)	SA	3,5
b. Neutron Flux - Upscale				
1) Flow Biased	S,D(g)	S/U(c), Q	W(d)(e),SA	1
2) High Flow Clamped	S	S/U(c), Q	W(d)(e), SA	1
c. Inoperative	N.A.	Q(j)	N.A.	1, 2, 3, 5
d. Downscale	S	Q	SA	1
3. Reactor Vessel Steam Dome Pressure - High	S	Q	R	1, 2(h)
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(h)
7. Drywell Pressure - High	S	Q	R	1, 2
8. Scram Discharge Volume Water Level - High				
a. Level Transmitter	S	Q	R	1, 2, 5[i]
b. Float Switch	N.A.	Q	R	1, 2, 5[i]

TABLE 4.3.1.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
9. Turbine Stop Valve - Closure	N.A.	Q	R	1
10. Turbine Control Valve Fast Closure, Trip Oil Pressure - Low	N.A.	Q	R	1
11. Reactor Mode Switch Shutdown Position	N.A.	R	N.A.	1, 2, 3, 4, 5
12. Manual Scram	N.A.	W	N.A.	1, 2, 3, 4, 5

(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 decades during each startup after entering OPERATIONAL CONDITION 2 and the IRM and APRM channels shall be determined to overlap for a least 1/2 decades 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) Verify measured core flow (total core flow) to be greater than or equal to established core flow at the existing loop flow (APRM % flow). During the starup test program, data shall be recorded for the parameters listed to provide a basis for establishing the specified relationships. Comparisons of the actual data in accordance with the criteria listed shall comence upon the conclusion of the starup test program.
(h) This function is not required to be OPERABLE when the reactor pressure vessel head is removed per Specification 3.10.1.
(i) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.
(j) If the RPS shorting links are required to be removed per Specification 3.9.2, they may be reinstalled for up to 2 hours for required surveillance. During this time, CORE ALTERATIONS shall be suspended, and no control rod shall be moved from its existing position.

3/4.3.2 ISOLATION ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The isolation actuation instrumentation channels shown in Table 3.3.2-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.2-2 and with ISOLATION SYSTEM RESPONSE TIME as shown in Table 3.3.2-3.

APPLICABILITY: As shown in Table 3.3.2-1.

ACTION:

a. With an isolation actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.2-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for one trip system:

1. If placing the inoperable channels(s) in the tripped condition would cause an isolation, the inoperable channel(s) shall be restored to OPERABLE status within:

a) 2 hours for trip functions not common* to the Reactor Protection System (RPS) and/or Emergency Core Cooling System (ECCS) Actuation Instrumentation, or

b) 6 hours for trip functions common* to RPS and/or ECCS Actuation Instrumentation.

If this cannot be accomplished, the ACTION required by Table 3.3.2-1 for the affected trip function shall be taken, or the channel shall be placed in the tripped condition.

2. If placing the inoperable channel(s) in the tripped condition would not cause an isolation, the inoperable channel(s) and/or that trip system shall be placed in the tripped condition within:

a) 1 hour for trip functions not common* to the RPS and/or ECCS Actuation Instrumentation,

b) 12 hours for trip functions common* to RPS Instrumentation,

c) 24 hours for trip functions common* to ECCS Actuation Instrumentation,

and

d) 12 hours for trip functions common* to RPS and ECCS Actuation Instrumentation.

The provisions of Specification 3.0.4 are not applicable.

* Trip functions common to RPS and/or ECCS Actuation Instrumentation are shown in Table 4.3.2.1-1.

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

c. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for both trip systems, place at least one trip system** in the tripped condition within 1 hour and take the ACTION required by Table 3.3.2-1.

SURVEILLANCE REQUIREMENTS

4.3.2.1 Each isolation actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.2.1-1.

4.3.2.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

4.3.2.2 The ISOLATION SYSTEM RESPONSE TIME of each isolation trip function shown in Table 3.3.2-3 shall be demonstrated to be within its limit at least once per 18 months. Each test shall include at least once channel per trip system such that all channels are tested at least once every N times 18 months, where N is the total number of redundant channels in a specific isolation trip system.

** The trip system need not be placed in the tripped condition if this would cause the Trip Function to occur. When a trip system can be placed in the tripped condition without causing the Trip Function to occur, place the trip system with the most inoperable channels in the tripped condition; if both systems have the same number of inoperable channels, place either trip system in the tripped condition.

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 - Be in at least STARTUP within 6 hours.

ACTION 23 - In OPERATIONAL CONDITION 1 or 2, verify the affected system isolation valves are closed within 1 hour and declare the affected system inoperable. In OPERATIONAL CONDITION 3, be in at least COLD SHUTDOWN within 12 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 - Close the affected system isolation valves within 1 hour.

TABLE NOTATIONS

* Required when (1) handling irradiated fuel in the refueling area secondary containment, or (2) during CORE ALTERATIONS, or (3) during operations with a potential for draining the reactor vessel with the vessel head removed and fuel in the vessel.

** May be bypassed under administrative control, with all turbine stop valves closed.

\# During operation of the associated Unit 1 or Unit 2 ventilation exhaust system.

(a) See Specification 3.6.3, Table 3.6.3-1 for primary containment isolation valves which are actuated by these isolation signals.

(b) A channel may be placed in an inoperable status for up to:

a) 2 hours for trip functions not common the the Reactor Protection System (RPS) and/or Emergency Core Cooling System (ECCS) Actuation Instrumentation, or
b) 6 hours for trip functions common to RPS and/or ECCS Actuation Instrumentation

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. Trip functions common to RPS and/or ECCS Actuation Instrumentation are shown in Table 4.3.2.1-1. In addition, for the HPCI system and RCIC system isolation, provided that the redundant isolation valve, inboard or outboard, as applicable, in each line is OPERABLE and all required actuation instrumentation for that valve is OPERABLE, one channel may be placed in an inoperable status for up to 8 hours for required surveillance without placing the channel or trip system in the tripped condition.

TABLE 3.3.2-1 (Continued)

TABLE NOTATIONS

(c) Actuates secondary containment isolation valves shown in Table 3.6.5.2.1-1 and/or 3.6.5.2.2-1 and signals B, H, S, U, R and T also start the standby gas treatment system.

(d) RWCU system inlet outboard isolation valve closes on SLCS "B" initiation. RWCU system inlet inboard isolation valve closes on SLCS "A" or SLCS "C" initiation.

(e) Manual initiation isolates the steam supply line outboard isolation valve and only following manual or automatic initiation of the system.

(f) In the event of a loss of ventilation the temperature - high setpoint may be raised by $50^{o}F$ for a period not to exceed 30 minutes to permit restoration of the ventilation flow without a spurious trip. During the 30 minute period, an operator, or other qualified member of the technical staff, shall observe the temperature indications continuously, so that, in the event of rapid increases in temperature, the main steam lines shall be manually isolated.

(g) Wide range accident monitor per Specification 3.3.7.5.

TABLE 4.3.2.1-1

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
1. MAIN STEAM LINE ISOLATION				
a. Reactor Vessel Water Level##				
1) Low, Low, Level 2	S	Q	R	1, 2, 3
2) Low, Low, Low - Level 1	S	Q	R	1, 2, 3
b. Main Steam Line Radiation#### - High	S	Q	R	1, 2, 3
c. Main Steam Line Pressure - Low	S	M	R	1
d. Main Steam Line Flow - High	S	M	R	1, 2, 3
e. Condenser Vacuum - Low	S	M	R	1, 2**, 3**
f. Outboard MSIV Room Temperature - High	S	M	R	1, 2, 3
g. Turbine Enclosure - Main Steam Line Tunnel Temperature - High	S	M	R	1, 2, 3
h. Manual Initiation	N.A.	R	N.A.	1, 2, 3
2. RHR SYSTEM SHUTDOWN COOLING MODE ISOLATION				
a. Reactor Vessel Water Level### Low - Level 3	S	Q	R	1, 2, 3
b. Reactor Vessel (RHR Cut-In Permissive) Pressure## - High	S	Q	R	1, 2, 3
c. Manual Initiation	N.A.	R	N.A.	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 FOR WHICH SURVEILLANCE REQUIRED
3. REACTOR WATER CLEANUP SYSTEM ISOLATION				
a. RWCS Δ Flow - High	S	M	R	1, 2, 3
b. RWCS Area Temperature - High	S	M	R	1, 2, 3
c. RWCS Area Ventilation Δ Temperature - High	S	M	R	1, 2, 3
d. SLCS Initiation	N.A.	R	N.A.	1, 2, 3
e. Reactor Vessel Water Level## Low, Low, - Level 2	S	Q	R	1, 2, 3
f. Manual Initiation	N.A.	R	N.A.	1, 2, 3
4. HIGH PRESSURE COOLANT INJECTION SYSTEM ISOLATION				
a. HPCI Steam Line Δ Pressure - High	S	M	R	1, 2, 3
b. HPCI Steam Supply Pressure - Low	S	M	R	1, 2, 3
c. HPCI Turbine Exhaust Diaphragm Pressure - High	S	M	R	1, 2, 3
d. HPCI Equipment Room Temperature - High	S	M	R	1, 2, 3
e. HPCI Equipment Room Δ Temperature - High	S	M	R	1, 2, 3
f. HPCI Pipe Routing Area Temperature - High	S	M	R	1, 2, 3
g. Manual Initiation	N.A.	R	N.A.	1, 2, 3
h. HPCI Steam Line Δ Pressure Timer	N.A.	M	R	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 FOR WHICH SURVEILLANCE REQUIRED
5. REACTOR CORE ISOLATION COOLING SYSTEM ISOLATION				
a. Reactor Steam Line Δ Pressure - High	S	M	R	1, 2, 3
b RCIC Steam Supply Pressure - Low	S	M	R	1, 2, 3
c. RCIC Turbine Exhaust Diaphragm Pressure - High	S	M	R	1, 2, 3
d. RCIC Equipment Room Temperature - High	S	M	R	1, 2, 3
e. RCIC Equipment Room Δ Temperature - High	S	M	R	1, 2, 3
f. RCIC Pipe Routing Area Temperature - High	S	M	R	1, 2, 3
g. Manual Initiation	N.A.	R	N.A.	1, 2, 3
h. RCIC Steam Line Δ Pressure Timer	N.A.	M	R	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 FOR WHICH SURVEILLANCE REQUIRED
6. PRIMARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level##				
1) Low, Low - Level 2	S	Q	R	1, 2, 3
2) Low, Low, Low - Level 1	S	Q	R	1, 2, 3
b. Drywell Pressure### - High	S	Q	R	1, 2, 3
c. North Stack Effluent Radiation - High	S	Q	R	1, 2, 3
d. Deleted				
e. Reactor Enclosure Ventilation Exhaust Duct - Radiation - High	S	M	R	1, 2, 3
f. Outside Atmosphere to Reactor Enclosure Δ Pressure - Low	N.A.	M	Q	1, 2, 3
g. Deleted				
h. Drywell Pressure## - High/ Reactor Pressure## - Low	S	Q	R	1, 2, 3
i. Primary Containment Instrument Gas to Drywell Δ Pressure - Low	N.A.	M	Q	1, 2, 3
j. Manual Initiation	N.A.	R	N.A.	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 FOR WHICH SURVEILLANCE REQUIRED
7. SECONDARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level## Low, Low - Level 2	S	M	R	1, 2, 3
b. Drywell Pressure### - High	S	M	R	1, 2, 3
c. 1. Refueling Area Unit 1 Ventilation Exhaust Duct Radiation - High	S	M	R	*#
2. Refueling Area Unit 2 Ventilation Exhaust Duct Radiation - High	S	M	R	*#
d. Reactor Enclosure Ventilation Exhaust Duct Radiation - High	S	M	R	1, 2, 3
e. Outside Atmosphere To Reactor Enclosure Δ Pressure - Low	N.A.	M	Q	1, 2, 3
f. Outside Atmosphere To Refueling Area Δ Pressure - Low	N.A.	M	Q	*
g. Reactor Enclosure Manual Initiation	N.A.	R	N.A.	1, 2, 3
h. Refueling Area Manual Initiation	N.A.	R	N.A.	*

*Required when (1) handling irradiated fuel in the refueling area secondary containment, or (2) during CORE ALTERATIONS, or (3) during operations with a potential for draining the reactor vessel with the vessel head removed and fuel in the vessel.

**When not administratively bypassed and/or when any turbine stop valve is open.

#During operation of the associated Unit 1 or Unit 2 ventilation exhaust system.

##These trip functions (1a, 2b, 3e, 6a, 6h, and 7a) are common to the ECCS actuation trip function.

###These trip functions (2a, 6b, and 7b) are common to the RPS and ECCS actuation trip functions.

####This trip function (1b) is common to the RPS trip function.

TABLE 3.3.3-1 (Continued)
EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION
TABLE NOTATIONS

(a) A channel may be placed in an inoperable status for up to 6 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) Also provides input to actuation logic for the associated emergency diesel generators.

(c) One trip system. Provides signal to HPCI pump suction valves only.

(d) On 1 out of 2 taken twice logic, provides a signal to trip the HPCI pump turbine only.

(e) The manual initiation push buttons start the respective core spray pump and diesel generator. The "A" and "B" logic manual push buttons also actuate an initiation permissive in the injection valve opening logic.

(f) A channel as used here is defined as the 127 bus relay for Item 1 and the 127, 127Y, and 127Z feeder relays with their associated time delay relays taken together for Item 2.

* When the system is required to be OPERABLE per Specification 3.5.2.

\# Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 100 psig.

** Required when ESF equipment is required to be OPERABLE.

\#\# Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 200 psig.

TABLE 3.3.3-1 (Continued)
EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION
ACTION STATEMENTS

ACTION 30 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. With one channel inoperable, place the inoperable channel in the tripped condition within 24 hours or declare the associated system inoperable.

b. With more than one channel inoperable, declare the associated system inoperable.

ACTION 31 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, declare the associated ECCS inoperable within 24 hours.

ACTION 32 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within 24 hours.

ACTION 33 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 24 hours or declare the associated ECCS inoperable.

ACTION 34 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. For one channel inoperable, place the inoperable channel in the tripped condition within 24 hours or declare the HPCI system inoperable.

b. With more than one channel inoperable, declare the HPCI system inoperable.

ACTION 35 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within 24 hours or declare the HPCI system inoperable.

ACTION 36 - With the number of OPERABLE channels less than the Total Number of Channels, declare the associated emergency diesel generator inoperable and take the ACTION required by Specification 3.8.1.1 or 3.8.1.2, as appropriate.

ACTION 37 - With the number of OPERABLE channels one less than the Total Number of Channels, place the inoperable channel in the tripped condition within 1 hour; operation may then continue until performance of the next required CHANNEL FUNCTIONAL TEST.

TABLE 4.3.3.1-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
1. CORE SPRAY SYSTEM				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	Q	R	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	S	Q	R	1, 2, 3
c. Reactor Vessel Pressure - Low	S	Q	R	1, 2, 3, 4*, 5*
d. Manual Initiation	N.A.	R	N.A.	1, 2, 3, 4*, 5*
2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	Q	R	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	S	Q	R	1, 2, 3
c. Reactor Vessel Pressure - Low	S	Q	R	1, 2, 3
d. Injection Valve Differential Pressure - Low (Permissive)	S	Q	R	1, 2, 3, 4*, 5*
e. Manual Initiation	N.A.	R	N.A.	1, 2, 3, 4*, 5*
3. HIGH PRESSURE COOLANT INJECTION SYSTEM***				
a. Reactor Vessel Water Level - Low Low, Level 2	S	Q	R	1, 2, 3
b. Drywell Pressure - High	S	Q	R	1, 2, 3
c. Condensate Storage Tank Level - Low	S	Q	R	1, 2, 3
d. Suppression Pool Water Level - High	S	Q	R	1, 2, 3
e. Reactor Vessel Water Level - High, Level 8	S	Q	R	1, 2, 3
f. Manual Initiation	N.A.	R	N.A.	1, 2, 3

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL C[illegible]	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
4. AUTOMATIC DEPRESSURIZATION SYSTEM#				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	Q	R	1, 2, 3
b. Drywell Pressure - High	S	Q	R	1, 2, 3
c. ADS Timer	N.A.	Q	Q	1, 2, 3
d. Core Spray Pump Discharge Pressure - High	S	Q	R	1, 2, 3
e. RHR LPCI Mode Pump Discharge Pressure - High	S	Q	R	1, 2, 3
f. Reactor Vessel Water Level - Low, Level 3	S	Q	R	1, 2, 3
g. Manual Initiation	N.A.	R	N.A.	1, 2, 3
h. ADS Drywell Pressure Bypass Timer	N.A.	Q	Q	1, 2, 3
5. LOSS OF POWER				
a. 4.16 kV Emergency Bus Under-voltage (Loss of Voltage)##	N.A.	R	N.A.	1, 2, 3, 4**, 5**
b. 4.16 kV Emergency Bus Under-voltage (Degraded Voltage)	S	M	R	1, 2, 3, 4**, 5**

* When the system is required to be OPERABLE per Specification 3.5.2.

** Required OPERABLE when ESF equipment is required to be OPERABLE.

*** Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 200 psig.

Not required to be OPERABLE when reactor steam dome pressure is less than or equal to 100 psig.

Loss of Voltage Relay 127-11X is not field setable.

LIMITING CONDITION FOR OPERATION

3.3.4.2 The end-of-cycle recirculation pump trip (EOC-RPT) system instrumentation channels shown in Table 3.3.4.2-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.4.2-2 and with the END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM RESPONSE TIME as shown in Table 3.3.4.2-3.

APPLICABILITY: OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 30% of RATED THERMAL POWER.

ACTION:

a. With an end-of-cycle recirculation pump trip system instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.4.2-2, declare the channel inoperable until the channel is restored to OPERABLE status with the channel setpoint adjusted consistent with the Trip Setpoint value.

b. With the number of OPERABLE channels one less than required by the Minimum OPERABLE Channels per Trip System requirement for one or both trip systems, place the inoperable channel(s) in the tripped condition within 12 hours.

c. With the number of OPERABLE channels two or more less than required by the Minimum OPERABLE Channels per Trip System requirement for one trip system and:

   1. If the inoperable channels consist of one turbine control valve channel and one turbine stop valve channel, place both inoperable channels in the tripped condition within 1 hour.

   2. If the inoperable channels include two turbine control valve channels or two turbine stop valve channels, declare the trip system inoperable.

d. With one trip system inoperable, restore the inoperable trip system to OPERABLE status within 72 hours or take the ACTION required by Specification 3.2.3.

e. With both trip systems inoperable, restore at least one trip system to OPERABLE status within one hour or take the ACTION required by Specification 3.2.3.

TABLE 3.3.4.2-1

END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM*
1. Turbine Stop Valve - Closure	2**
2. Turbine Control Valve-Fast Closure	2**

*A trip system may be placed in an inoperable status for up to 6 hours for required suveillance provided that the other trip system is OPERABLE.

**This function shall be automatically bypassed when turbine first stage pressure is equivalent to THERMAL POWER less than 30% of RATED THERMAL POWER.

TABLE 4.3.4.2.1-1

END-OF-CYCLE RECIRCULATION PUMP TRIP SYSTEM SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION
1. Turbine Stop Valve - Closure	Q*	R
2. Turbine Control Valve-Fast Closure	Q*	R

*Including trip system logic testing.

TABLE 3.3.5-1

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

FUNCTIONAL UNITS	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION*	ACTION
a. Reactor Vessel Water Level - Low Low, Level 2	4#	50
b. Reactor Vessel Water Level - High, Level 8	4#	51
c. Condensate Storage Tank Water Level - Low	2**	52
d. Manual Initiation	1/system***	53

*A channel may be placed in an inoperable status for up to 6 hours for required surveillance without placing the trip system in the tripped condition provided all other channels monitoring that parameter are OPERABLE.

**One trip system with one-out-of-two logic.

***One trip system with one channel.

#One trip system with one-out-of-two twice logic.

TABLE 3.3.5-1 (Continued)

REACTOR CORE ISOLATION COOLING SYSTEM
ACTION STATEMENTS

ACTION 50 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. With one channel inoperable, place the inoperable channel in the tripped condition within 24 hours or declare the RCIC system inoperable. |

b. With more than one channel inoperable, declare the RCIC system inoperable.

ACTION 51 - With the number of OPERABLE channels less than required by the minimum OPERABLE channels per Trip System requirement, declare the RCIC system inoperable within 24 hours. |

ACTION 52 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, place at least one inoperable channel in the tripped condition within 24 hours or declare the RCIC system inoperable. |

ACTION 53 - With the number of OPERABLE channels one less than required by the Minimum OPERABLE Channels per Trip System requirement, restore the inoperable channel to OPERABLE status within 24 hours or declare the RCIC system inoperable. |

TABLE 4.3.5.1-1

REACTOR CORE ISOLATION SYSTEM ACTUATION INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNITS	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	
a. Reactor Vessel Water Level - Low Low, Level 2	S	Q	R	I
b. Reactor Vessel Water Level - High, Level 8	S	Q	R	I
c. Condensate Storage Tank Level - Low	S	Q	R	I
d. Manual Initiation	N.A.	R	N.A.	

TABLE 4.3.6-1

CONTROL ROD BLOCK INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION[a]	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
1. ROD BLOCK MONITOR				
a. Upscale	N.A.	S/U[b][c],Q[c]	SA	1*
b. Inoperative	N.A.	S/U[b][c],Q[c]	N.A.	1*
c. Downscale	N.A.	S/U[b][c],Q[c]	SA	1*
2. APRM				
a. Flow Biased Neutron Flux - Upscale	N.A.	S/U[b],Q	SA	1
b. Inoperative	N.A.	S/U[b],Q	N.A.	1, 2, 5
c. Downscale	N.A.	S/U[b],Q	SA	1
d. Neutron Flux - Upscale, Startup	N.A.	S/U[b],Q	SA	2, 5
3. SOURCE RANGE MONITORS				
a. Detector not full in	N.A.	S/U[b],W	N.A.	2, 5
b. Upscale	N.A.	S/U[b],W	SA	2, 5
c. Inoperative	N.A.	S/U[b],W	N.A.	2, 5
d. Downscale	N.A.	S/U[b],W	SA	2, 5
4. INTERMEDIATE RANGE MONITORS				
a. Detector not full in	N.A.	S/U[b],W	N.A.	2, 5
b. Upscale	N.A.	S/U[b],W	SA	2, 5
c. Inoperative	N.A.	S/U[b],W	N.A.	2, 5
d. Downscale	N.A.	S/U[b],W	SA	2, 5
5. SCRAM DISCHARGE VOLUME				
a. Water Level-High	N.A.	Q	R	1, 2, 5**
6. REACTOR COOLANT SYSTEM RECIRCULATION FLOW				
a. Upscale	N.A.	S/U[b],Q	SA	1
b. Inoperative	N.A.	S/U[b],Q	N.A.	1
c. Comparator	N.A.	S/U[b],Q	SA	1
7. REACTOR MODE SWITCH SHUTDOWN POSITION	N.A.	R	N.A.	3, 4

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

The reactor protection system automatically initiates a reactor scram to:

a. Preserve the integrity of the fuel cladding.

b. Preserve the integrity of the reactor coolant system.

c. Minimize the energy which must be absorbed following a loss-of-coolant accident, and

d. Prevent inadvertent criticality.

This specification provides the limiting conditions for operation necessary to preserve the ability of the system to perform its intended function even during periods when instrument channels may be out of service because of maintenance. When necessary, one channel may be made inoperable for brief intervals to conduct required surveillance.

The reactor protection system is made up of two independent trip systems. There are usually four channels to monitor each parameter with two channels in each trip system. The outputs of the channels in a trip system are combined in a logic so that either channel will trip that trip system. The tripping of both trip systems will produce a reactor scram. The system meets the intent of IEEE-279 for nuclear power plant protection systems. Specified surveillance intervals and surveillance and maintenance outage times have been determined in accordance with NEDC-30851P, "Technical Specification Improvement Analyses for BWR Reactor Protection System," as approved by the NRC and documented in the NRC Safety Evaluation Report (SER) (letter to T. A. Pickens from A. Thadani dated July 15, 1987. The bases for the trip settings of RPS are discussed in the bases for Specification 2.2.1.

The measurement of response time at the specified frequencies provides assurance that the protective functions associated with each channel are completed within the time limit assumed in the safety analyses. No credit was taken for those channels with response times indicated as not applicable. Response time may be demonstrated by any series of sequential, overlapping or total channel test measurement, provided such tests demonstrate the total channel response time as defined. Sensor response time verification may be demonstrated by either (1) inplace, onsite or offsite test measurements, or (2) utilizing replacement sensors with certified response times.

3/4.3.2 ISOLATION ACTUATION INSTRUMENTATION

This specification ensures the effectiveness of the instrumentation used to mitigate the consequences of accidents by prescribing the OPERABILITY trip setpoints and response times for isolation of the reactor systems. When necessary, one channel may be inoperable for brief intervals to conduct required surveillance.

Specified surveillance intervals and maintenance outage times have been determined in accordance with NEDC-30851P, Supplement 2, "Technical Specification Improvement Analysis for BWR Instrumentation Common to RPS and ECCS Instrumentation" as approved by the NRC and documented in the NRC Safety Evaluation Report (SER) (letter to D. N. Grace from C. E. Rossi dated January 6, 1989).

Some of the trip settings may have tolerances explicitly stated where both the high and low values are critical and may have a substantial effect on safety. The setpoints of other instrumentation, where only the high or low end of the setting have a direct bearing on safety, are established at a level away from the normal operating range to prevent inadvertent actuation of the systems involved.

Except for the MSIVs, the safety analysis does not address individual sensor response times or the response times of the logic systems to which the sensors are connected. For D.C. operated valves, a 3 second delay is assumed before the valve starts to move. For A.C. operated valves, it is assumed that the A.C. power supply is lost and is restored by startup of the emergency diesel generators. In this event, a time of 13 seconds is assumed before the valve starts to move. In addition to the pipe break, the failure of the D.C. operated valve is assumed; thus the signal delay (sensor response) is concurrent with the 10-second diesel startup and the 3 second load center loading delay. The safety analysis considers an allowable inventory loss in each case which in turn determines the valve speed in conjunction with the 13-second delay. It follows that checking the valve speeds and the 13-second time for emergency power establishment will establish the response time for the isolation functions.

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is an allowance for instrument drift specifically allocated for each trip in the safety analyses.

3/4.3.3 EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

The emergency core cooling system actuation instrumentation is provided to initiate actions to mitigate the consequences of accidents that are beyond the ability of the operator to control. This specification provides the OPERABILITY requirements, trip setpoints and response times that will ensure effectiveness of the systems to provide the design protection. Although the instruments are listed by system, in some cases the same instrument may be used to send the actuation signal to more than one system at the same time.

Specified surveillance intervals and maintenance outage times have been determined in accordance with NEDC-30936P, Parts 1 and 2, "Technical Speicification Improvement Methodology (with Demonstration for BWR ECCS

3/4.3.3 EMERGENCY CORE COOLING ACTUATION INSTRUMENTATION (Continued)

Actuation Instrumentation)" as approved by the NRC and documented in the SER (letter to D. N. Grace from A. C. Thadani dated December 9, 1988 (Part 1) and letter to D. N. Grace from C. E. Rossi dated December 9, 1988 (Part 2)).

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is an allowance for instrument drift specifically allocated for each trip in the safety analyses.

3/4.3.4 RECIRCULATION PUMP TRIP ACTUATION INSTRUMENTATION

The anticipated transient without scram (ATWS) recirculation pump trip system provides a means of limiting the consequences of the unlikely occurrence of a failure to scram during an anticipated transient. The response of the plant to this postulated event falls within the envelope of study events in General Electric Company Topical Report NEDO-10349, dated March 1971, NEDO-24222, dated December 1979, and Section 15.8 of the FSAR.

The end-of-cycle recirculation pump trip (EOC-RPT) system is a supplement to the reactor trip. During turbine trip and generator load rejection events, the EOC-RPT with reduce the likelihood of reactor vessel level decreasing to level 2. Each EOC-RPT system trips both recirculation pumps, reducing coolant flow in order to reduce the void collapse in the core during two of the most limiting pressurization events. The two events for which the EOC-RPT protective feature will function are closure of the turbine stop valves and fast closure of the turbine control valves.

A fast closure sensor from each of two turbine control valves provides input to the EOC-RPT system; a fast closure sensor from each of the other two turbine control valves provides input to the second EOC-RPT system. Similarly, a position switch for each of two turbine stop valves provides input to one EOC-RPT system; a position switch from each of the other two stop valves provides input to the other EOC-RPT system. For each EOC-RPT system, the sensor relay contacts are arranged to form a 2-out-of-2 logic for the fast closure of turbine control valves and a 2-out-of-2 logic for the turbine stop valves. The operation of either logic will actuate the EOC-RPT system and trip both recirculation pumps.

Specified surveillance intervals and maintenance outage times have been specified to correspond with the equivalent times in Table 4.3.1, since the initiating instrumentation is identical. This was concurred by GE via their letter to the BWR Owner's Group dated December 22, 1989, SUBJECT: "Clarification of Limerick 182 Proposed Technical Specification Changes Common to RPS or ECCS Actuation Instrumentation."

Each EOC-RPT system may be manually bypassed by use of a keyswitch which is administratively controlled. The manual bypasses and the automatic Operating Bypass at less than 30% of RATED THERMAL POWER are annunciated in the control room.

The EOC-RPT system response time is the time assumed in the analysis between initiation of valve motion and complete suppression of the electric arc, i.e., 175 ms. Included in this time are: the response time of the sensor, the time allotted for breaker arc suppression, and the response time of the system logic.

3/4.3.4 RECIRCULATION PUMP TRIP ACTUATION INSTRUMENTATION (Continued)

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is an allowance for instrument drift specifically allocated for each trip in the safety analyses.

3/4.3.5 REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

The reactor core isolation cooling system actuation instrumentation is provided to initiate actions to assure adequate core cooling in the event of reactor isolation from its primary heat sink and the loss of feedwater flow to the reactor vessel. This instrumentation does not provide actuation of any of the emergency core cooling equipment.

Specified surveillance intervals and maintenance outage times have been specified in accordance with recommendations made by GE in their letter to the BWR Owner's Group dated August 7, 1989. SUBJECT: "Clarification of Technical Specification changes given in ECCS Actuation Instrumentation Analysis."

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is an allowance for instrument drift specifically allocated for each trip in the safety analyses.

3/4.3.6 CONTROL ROD BLOCK INSTRUMENTATION

The control rod block functions are provided consistent with the requirements of the specifications in Section 3/4.1.4, Control Rod Program Controls and Section 3/4.2 Power Distribution Limits and Section 3/4.3 Instrumentation. The trip logic is arranged so that a trip in any one of the inputs will result in a control rod block.

Specified surveillance intervals and maintenance outage times have been determined in accordance with NEDC-30851P, Supplement 1, "Technical Specification Improvement Analysis for BWR Control Rod Block Instrumentation" as approved by the NRC and documented in the SER (letter to D. N. Grace from C. E. Rossi dated September 22, 1988).

Operation with a trip set less conservative than its Trip Setpoint but within its specified Allowable Value is acceptable on the basis that the difference between each Trip Setpoint and the Allowable Value is an allowance for instrument drift specifically allocated for each trip in the safety analyses.

3/4.3.7 MONITORING INSTRUMENTATION

3/4.3.7.1 RADIATION MONITORING INSTRUMENTATION

The OPERABILITY of the radiation monitoring instrumentation ensures that; (1) the radiation levels are continually measured in the areas served by the individual channels, and (2) the alarm or automatic action is initiated when the radiation level trip setpoint is exceeded; and (3) sufficient information is available on selected plant parameters to monitor and assess these variables following an accident. This capability is consistent with 10 CFR Part 50, Appendix A, General Design Criteria 19, 41, 60, 61, 63, and 64.

3.4.3.7.2 SEISMIC MONITORING INSTRUMENTATION

The OPERABILITY of the seismic monitoring instrumentation ensures that sufficient capability is available to promptly determine the magnitude of a seismic event and evaluate the response of those features important to safety. This capability is required to permit comparison of the measured response to that used in the design basis for the unit.

3/4.3.7.3 METEOROLOGICAL MONITORING INSTRUMENTATION

The OPERABILITY of the meteorological monitoring instrumentation ensures that sufficient meteorological data is available for estimating potential radiation doses to the public as a result of a routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the need for initiating protective measures to protect the health and safety of the public. This instrumenation is consistent with the recommendations of Regulatory Guide 1.23 "Onsite Meteorological Programs," February, 1972.

Site data compiled since January 1972 provide correlation between Elevation 1 (Tower 1) and Elevation 1 (Tower 2), and between Elevation 2 (Tower 1) and Elevation 2 (Tower 2). This correlation serves as justification for the use of the appropriate Tower 2 instrument as a back-up to the Tower 1 instrument as shown in Table 3.3.7.3-1.

3/4.3.7.4 REMOTE SHUTDOWN SYSTEM INSTRUMENTATION AND CONTROLS

The OPERABILITY of the remote shutdown system instrumentation and controls ensures that sufficient capability is available to permit shutdown and maintenance of HOT SHUTDOWN of the unit from locations outside of the control room. This capability is required in the event control room habitability is lost and is consistent with General Design Criterion 19 of 10 CFR Part 50, Appendix A. The Unit 1 RHR transfer switches are included only due to their potential impact on the RHRSW system, which is common to both units.

3/4.3.7.5 ACCIDENT MONITORING INSTRUMENTATION

The OPERABILITY of the accident monitoring instrumentation ensures that sufficient information is available on selected plant parameters to monitor and assess important variables following an accident. This capability is consistent with the recommendations of Regulatory Guide 1.97, "Instrumentation for Light Water Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident", December 1975 and NUREG-0737, "Clarification of TMI Action Plan Requirements", November 1980.

3/4.3.7.6 SOURCE RANGE MONITORS

The source range monitors provide the operator with information of the status of the neutron level in the core at very low power levels during startup and shutdown. At these power levels, reactivity additions shall not be made without this flux level information available to the operator. When the intermediate range monitors are on scale, adequate information is available without the SRMs and they can be retracted.

3/4.3.7.7 TRAVERSING IN-CORE PROBE SYSTEM

The OPERABILITY of the traversing in-core probe system with the specified minimum complement of equipment ensures that the measurements obtained from use of this equipement accurately represent the spatial neutron flux distribution of the reactor core.

The TIP system OPERABILITY is demonstrated by normalizing all probes (i.e., detectors) prior to performing an LPRM calibration function. Monitoring core thermal limits may involve utilizing individual detectors to monitor selected areas of the reactor core, thus all detectors to be used OPERABLE. The OPERABILITY of individual detectors to be used for monitoring is demonstrated by comparing the detector(s) output in the resultant heat balance calculation (P-1) with data obtained during a previous heat balance calculation (P-1).

3/4.3.7.8 CHLORINE AND TOXIC GAS DETECTION SYSTEMS

The OPERABILITY of the chlorine and toxic gas detection systems ensures that an accidental chlorine and/or toxic gas release will be detected promptly and the necessary protective actions will be automatically initiated for chlorine and manually initiated for toxic gas to provide protection for control room personnel. Upon detection of a high concentration of chlorine, the control room emergency ventilation system will automatically be placed in the chlorine isolation mode of operation to provide the required protection. Upon detection of a high concentration of toxic gas, the control room emergency ventilation system will manually be placed in the chlorine isolation mode of operation to provide the required protection. The detection systems required by this specification are consistent with the recommendations of Regulatory Guide 1.95 "Protection of Nuclear Power Plant Control Room Operators against an Accidental Chlorine Release", February 1975.

3/4.3.7.9 FIRE DETECTION INSTRUMENTATION

OPERABILITY of the detection instrumentation ensures that both adequate warning capability is available for prompt detection of fires and that fire suppression systems, that are actuated by fire detectors, will discharge extinguishing agent in a timely manner. Prompt detection and suppression of fires will reduce the potential for damage to safety-related equipment and is an integral element in the overall facility fire protection program.

Fire detectors that are used to actuate fire suppression systems represent a more critically important component of a plant's fire protection program than detectors that are installed solely for early fire warning and notification. Consequently, the minimum number of OPERABLE fire detectors must be greater.

The loss of detection capability for fire suppression systems, actuated by fire detectors, represents a significant degradation of fire protection for any area. As a result, the establishment of a fire watch patrol must be initiated at an earlier stage than would be warranted for the loss of detectors that provide only early fire warning. The establishment of frequent fire patrols in the affected areas is required to provide detection capability until the inoperable instrumentation is restored to OPERABILITY.

3/4.3.7.10 LOOSE-PART DETECTION SYSTEM

The OPERABILITY of the loose-part detection system ensures that sufficient capability is available to detect loose metallic parts in the primary system to avoid or mitigate damage to primary system components. The allowable out-of-service times and surveillance requirements are consistent with the recommendations of Regulatory Guide 1.133, "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors", May 1981.

3/4.3.7.11 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirement of General Design Criteria 60,63, and 64 of Appendix A to 10 CFR Part 50.

3/4.3.7.12 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. This instrumentation also includes provisions for monitoring the concentrations of potentially explosive gas mixtures in the off-gas system. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

3/4.3.8 TURBINE OVERSPEED PROTECTION SYSTEM

This specification is provided to ensure that the turbine overspeed protection system instrumentation and the turbine speed control valves are OPERABLE and will protect the turbine from excessive overspeed. Protection from turbine excessive overspeed is required since excessive overspeed of the turbine could generate potentially damaging missiles which could impact and damage safety related components, equipment or structures.

3/4.3.9 FEEDWATER/MAIN TURBINE TRIP SYSTEM ACTUATION INSTRUMENTATION

The feedwater/main turbine trip system actuation instrumentation is provided to initiate action of the feedwater system/main turbine trip system in the event of failure of feedwater controller under maximum demand.

ENCLOSURE 1

GE Nuclear Energy

General Electric Company
175 Curtner Avenue, San Jose, CA 95125

OG9-1219-32D

December 22, 1989

TO: BWROG Technical Specification Committee

FROM: W. P. Sullivan

SUBJECT: Clarification of Limerick 1 & 2 Proposed Technical Specification Changes Common to Reactor Protection System or ECCS Actuation Instrumentation

REFERENCE:

1) NEDC-30851P-A, Supplement 2, "Technical Specification Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation", March 1989.

2) NEDC-30851P-A, "Technical Specification Improvement Analysis for the BWR Reactor Protection System", March 1988.

3) NEDC-30851P-A, Supplement 1, Technical Specification Improvement Analysis for BWR Control Rod Block Instrumentation", October 1988.

This letter is in response to a question concerning Limerick 1 & 2 proposed technical specification changes common to RPS or ECCS actuation instrumentation trip functions. Since other BWR plants may have the same common instrumentation as Limerick 1 and 2, this letter is being distributed to all BWR utilities participating in the BWR Owners' Group Technical Specification Improvement Program D.

The trip functions in question are the primary containment isolation trip initiated by both high drywell pressure and low reactor pressure which is common to the ECCS actuation instrumentation and the End-of-Cycle Recirculation Pump Trip (EOC-RPT) signals which are common to the RPS scram signals. Our review of these common trip functions indicate that the proposed surveillance test interval (STI) changes are bounded by the existing NRC approved reference analyses. The following is a discussion of the basis for this conclusion:

A. Limerick 1 & 2 Primary Containment Isolation Initiated by the Combined High Drywell Pressure and Low Reactor Pressure Trip

Reactor low water level and high drywell pressure were identified in Reference 1 as the primary and secondary isolation trip functions common to either the RPS or ECCS actuation trip functions. In the Limerick 1 & 2 Technical Specifications, the combined high drywell pressure and low reactor

pressure trip function for primary containment isolation is also common to the ECCS actuation trip function. The STI for this combined trip function was not changed in the sample modified isolation actuation technical specification given in Enclosure 2, Table 4.3.2.1.1, Item 6h, of the NRC Safety Evaluation Report (SER) in Reference 1. Although this change was not explicitly identified in the Reference 1 analysis as a common instrumentation trip function, the change is still bounded by the NRC approved Reference 1 analysis. In the Reference 1 analysis the effect of changing a single isolation trip function STI (either reactor low water level or high drywell pressure) was evaluated to have an acceptably low effect on the isolation actuation failure frequency. Since the combined high drywell pressure and low reactor pressure trip function is backed up by the low reactor water level trip function, the effect of changing the STI for this combined trip function is also acceptably low. For this reason, changing the STI from 1 month to 3 months for the combined high drywell and low reactor pressure trip function is bounded by the NRC approved SER.

B. Limerick 1 & 2 EOC-RPT Actuation Instrumentation Trip Functions

The EOC-RPT is initiated by signals common to the RPS. These signals (turbine stop valve closure and turbine control valve low hydraulic pressure) were not identified as common trip functions in the RPS technical specification improvement analysis (Reference 2). Although STI changes to the common EOC-RPT trip functions were not explicitly identified in the Reference 2 analysis, the changes can be considered bounded by this analysis. The basis for this conclusion is similar to the basis established in Reference 3 for the control rod block instrumentation common to the RPS. Failure of the EOC-RPT trip function could lead to exceeding the Minimum Critical Power Ratio (MCPR) similar to the consequences of a unmitigated rod withdrawal error. The slight increase in risk of an MCPR violation due to extending EOC-RPT STIs is offset by the benefits associated with the similar approved STIs for the RPS. This is the same reasoning that was approved by NRC in Reference 3.

If you have any questions concerning the above please call either myself (408) 925-6992 or Jim Klapproth (408) 925-5434.

W. P. Sullivan

W. P. Sullivan
Reliability Engineering Services
M/C 789 (408)925-6992

Approved: S. Vollmer
for A. E. Rogers, Manager
Reliability Engineering
Services

Approved: J. F. Klapproth for
S. J. Stark, Manager
BWR Owners' Group
Programs

cc: S.D. Floyd, BWROG Chairman
G.J. Beck, BWROG Vice-Chairman

ENCLOSURE 2

GE Nuclear Energy

General Electric Company
175 Curtner Avenue, San Jose, CA 95125

OG9-749-32D

August 7, 1989

TO: BWROG Technical Specification Committee

FROM: W. P. Sullivan

SUBJECT: Clarification of Technical Specification Changes Given in ECCS Actuation Instrumentation Analysis

REFERENCE:
NEDC-30936P-A, "BWR Owners' Group Technical Specification Improvement Methodology (With Demonstration for BWR ECCS Actuation Instrumentation), Part 2, December 1986.

Enclosed are clarifications to technical specification changes given in Appendix A of the reference report to assist you in your individual plant submittal to the NRC. These clarifications came from questions raised by members of the Technical Specification Committee.

If you have any questions concerning the enclosed material please call either myself (408) 925-6992 or Jim Klapproth (408) 925-5434.

W. P. Sullivan

W. P. Sullivan
Reliability Engineering Services
M/C 789 (408)925-6992

Enclosures

cc: S.D. Floyd, BWROG Chairman
G.J. Beck, BWROG Vice Chairman

Clarifications to Changes Given in Appendix A of NEDC-30936P-A

REFERENCE:

NEDC-30936P-A, "BWR Owners' Group Technical Specification Improvement Methodology (With Demonstration for BWR ECCS Actuation Instrumentation), Part 2, December 1986.

1) Standard Technical Specification, Action b. of paragraph 3/4.3.3 ECCS Actuation Instrumentation Limiting Condition for Operation for BWR 6 Solid-State Plants, BWR 5/6 Relay Plants, and BWR 3/4 Plants was modified as follows:

> "b. With one or more ECCS actuation instrumentation channels inoperable, within 24 hours take the ACTION required by Table 3.3.3-1."

In the technical specification markup for the above product lines, Table 3.3.3-1 was not included in Appendix A of the reference report. Also, the current modification as written implies a 24 hour AOT before taking any action listed in Table 3.3.3-1. It was intended that Allowed Out-of-Service Time (AOT) of 24 hours apply to the individual actions listed in Table 3.3.3-1. Therefore, when making your technical specification submittal for ECCS actuation instrumentation the following changes relating to repair AOT should be incorporated:

a) No change to Action b. of paragraph 3/4.3.3. The paragraph should read as follows:

> "With one or more ECCS actuation instrumentation channels inoperable, take the ACTION required by Table 3.3.3-1."

b) Markup ACTIONS given in Table 3.3.3-1 according to the attached Table 3.3.3-1 modifications for Standard Technical Specifications.

2) Technical specification changes to RCIC were not included in the reference report. The required modifications are given in the attached markups of Standard Technical Specifications for the RCIC actuation instrumentation.

3) A complete technical specification markup for the ECCS and RCIC Actuation Instrumentation is provided in the enclosure for the three current standard technical specifications (BWR-4, BWR-5, and BWR-6) and Clinton BWR-6 Solid-State plant technical specification. The following is a listing of the Enclosures:

Enclosure 1 - BWR 6 (Clinton) Solid-State ECCS Actuation Instrumentation
Enclosure 2 - BWR 6 ECCS Actuation Instrumentation
Enclosure 3 - BWR 5 ECCS Actuation Instrumentation
Enclosure 4 - BWR 4 ECCS Actuation Instrumentation
Enclosure 5 - BWR 6 (Clinton) Solid-State RCIC Actuation Instrumentation
Enclosure 6 - BWR 6 RCIC Actuation Instrumentation
Enclosure 7 - BWR 5 RCIC Actuation Instrumentation
Enclosure 8 - BWR 4 RCIC Actuation Instrumentation

Enclosure 1

BWR 6 (Clinton) Solid-State ECCS Actuation Instrumentation Technical Specification

3/4.3.3 EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3 The emergency core cooling system (ECCS) actuation instrumentation channels shown in Table 3.3.3-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.3-2 and with EMERGENCY CORE COOLING SYSTEM RESPONSE TIME as shown in Table 3.3.3-3.

APPLICABILITY: As shown in Table 3.3.3-1.

ACTION:

a. With an ECCS actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Value column of Table 3.3.3-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With one or more ECCS actuation instrumentation channels inoperable, take the ACTION required by Table 3.3.3-1.

c. With either ADS trip system "1" or "2" inoperable, restore the inoperable trip system to OPERABLE status within:

   1. 7 days, provided that the HPCS and RCIC systems are OPERABLE, or
   2. 72 hours, provided either the HPCS or RCIC systems are inoperable.

   Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to $\leq$ 100 psig within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.3.3.1 Each ECCS actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.3.1-1.

4.3.3.2 LOGIC SYSTEM FUNCTIONAL TESTS shall be performed at least once per 18 months. The actuation system logic associated with each of the ECCS divisions shall be manually tested independent of the SELF TEST SYSTEM during alternate refueling outages such that all divisions and all trip functions are tested at least once every four fuel cycles.[a]

4.3.3.3 The ECCS RESPONSE TIME of each ECCS trip function shown in Table 3.3.3-3 shall be demonstrated to be within the limit at least once per 18 months. Each test shall include at least one channel per trip system such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific ECCS trip system.

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[a]Manual testing for the purpose of satisfying Specification 4.3.3.2 is not required until after shutdown during the first regularly scheduled refueling outage.

TABLE 3.3.3-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION	APPLICABLE OPERATIONAL CONDITIONS	ACTION
A. DIVISION 1 TRIP SYSTEM			
1. RHR-A (LPCI MODE) & LPCS SYSTEM			
a. Reactor Vessel Water Level - Low Low Low, Level 1	2(b)(a)	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	2(b)(a)	1, 2, 3	30
c. Reactor Vessel Pressure-Low (LPCI and LPCS Injection Valve Permissive)	4(a)	1, 2, 3 4*, 5*	32 33
d. LPCI Pump (A) Start Time Delay Logic Card ##	1	1, 2, 3, 4*, 5*	32
e. LPCS Pump Discharge Flow - Low ##	1	1, 2, 3, 4*, 5*	40
f. LPCI Pump (A) Discharge Flow - Low ##	1	1, 2, 3, 4*, 5*	40
g. Manual Initiation	1(b)	1, 2, 3, 4*, 5*	35
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "1" # ADS LOGIC "A" AND "E"			
a. Reactor Vessel Water Level - Low Low Low, Level 1	2(a)	1, 2, 3	30
b. Drywell Pressure - High	2(a)	1, 2, 3	30
c. ADS Timer	1	1, 2, 3	32
d. Reactor Vessel Water Level - Low, Level 3 (Permissive)	1	1, 2, 3	32
e. LPCS Pump Discharge Pressure-High (Permissive)	2(a)	1, 2, 3	32
f. LPCI Pump (A) Discharge Pressure-High (Permissive)	2(a)	1, 2, 3	32
g. ADS Drywell Pressure Bypass Timer	2	1, 2, 3	30
h. Manual Inhibit ADS Switch	1	1, 2, 3	35
i. Manual Initiation	2	1, 2, 3	35

TABLE -1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION	APPLICABLE OPERATIONAL CONDITIONS	ACTION
B. DIVISION II TRIP SYSTEM			
1. RHR B & C (LPCI MODE)			
a. Reactor Vessel Water Level - Low Low Low, Level 1	2(b)(a)	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	2(b)(a)	1, 2, 3	30
c. Reactor Vessel Pressure-Low (LPCI Injection Valve Permissive)	4(a)	1, 2, 3 4*, 5*	32 33
d. LPCI Pump (B) Start Time Delay Logic Card	1	1, 2, 3, 4*, 5*	32
e. LPCI Pump (B) Discharge Flow - Low##	1	1, 2, 3, 4*, 5*	40
f. LPCI Pump (C) Discharge Flow - Low##	1	1, 2, 3, 4*, 5*	40
g. Manual Initiation	1(b)	1, 2, 3, 4*, 5*	35
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "2" ADS LOGIC "B" AND "F"			
a. Reactor Vessel Water Level - Low Low Low, Level 1	2(a)	1, 2, 3	30
b. Drywell Pressure - High	2(a)	1, 2, 3	30
c. ADS Timer	1	1, 2, 3	32
d. Reactor Vessel Water Level - Low, Level 3 (Permissive)	1	1, 2, 3	32
e. LPCI Pump (B and C) Discharge Pressure - High (Permissive)	2/pump(a)	1, 2, 3	32
f. ADS Drywell Pressure Bypass Timer	2	1, 2, 3	30
g. Manual Inhibit ADS Switch	1	1, 2, 3	35
h. Manual Initiation	2	1, 2, 3	35

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION	APPLICABLE OPERATIONAL CONDITIONS	ACTION
C. DIVISION III TRIP SYSTEM			
1. HPCS SYSTEM			
a. Reactor Vessel Water Level-Low, Low, Level 2	4(b)(a)	1, 2, 3, 4*, 5*	36
b. Drywell Pressure - High †	4(b)(a)	1, 2, 3	36
c. Reactor Vessel Water Level-High, Level 8	2(c)	1, 2, 3, 4*, 5*	32
d. RCIC Storage Tank Level-Low	2(d)(a)	1, 2, 3, 4*, 5*	37
e. Suppression Pool Water Level-High##	2(d)(a)	1, 2, 3, 4*, 5*	37
f. HPCS Pump Discharge Pressure-High##	1	1, 2, 3, 4*, 5*	40
g. HPCS System Flow Rate-Low##	1	1, 2, 3, 4*, 5*	40
h. Manual Initiation †	1	1, 2, 3, 4*, 5*	35

	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM OPERABLE CHANNELS	APPLICABLE OPERATIONAL CONDITIONS	ACTION
D. LOSS OF POWER					
1. 4.16 kV Emergency Bus Undervoltage (Loss of Voltage)					
a. Divisions 1 & 2	2/Division	2/Division	2/Division	1, 2, 3, 4**, 5**	38
b. Division 3	4	2	4	1, 2, 3, 4**, 5**	38
2. 4.16 kV Emergency Bus Undervoltage (Degraded Voltage)					
a. Divisions 1 & 2	2/Division	2/Division	2/Division	1, 2, 3, 4**, 5**	39
b. Division 3 ††	3	3	3	1, 2, 3, 4**, 5**	39

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TABLE NOTATIONS

(a) A channel may be placed in an inoperable status for up to 6 hours during periods of 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 associated division diesel generator.

(c) Provides signal to close HPCS pump injection valve only.

(d) Provides signal to HPCS pump suction valves only.

* When the system is required to be OPERABLE per Specification 3.5.2 or 3.5.3.

** Required when ESF equipment is required to be OPERABLE.

Not required to be OPERABLE when reactor steam dome pressure is ≤ 100 psig.

These Trip Functions are not required for ECCS actuation.

† The HPCS initiation functions of the Drywell Pressure - High and Manual Initiation are not required to be OPERABLE with indicated reactor vessel water level on the wide range instrument greater than the Level-8 setpoint coincident with the reactor steam dome pressure less than 600 psig.

†† One relay with three inputs in 3 out of 3 logic.

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

ACTION

ACTION 30 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. With one channel inoperable, place the inoperable channel in the tripped condition within ~~1 hour~~* or declare the associated system inoperable. 24 hours
b. With more than one channel inoperable, declare the associated system inoperable.

ACTION 31 - Deleted.

ACTION 32 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, within 24 hours declare the associated ADS trip system or ECCS inoperable.

ACTION 33 - With the number of OPERABLE channels less than the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel(s) in the tripped condition within ~~1 hour~~. 24 hours

ACTION 34 - Deleted.

ACTION 35 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within ~~8 hours~~ 24 hours or declare the associated ADS valve or ECCS inoperable.

ACTION 36 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. For one trip system, place that trip system in the tripped condition within ~~one hour~~* 24 hours or declare the HPCS system inoperable.
b. For both trip systems, declare the HPCS system inoperable.

ACTION 37 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within ~~1 hour~~* 24 hours or declare the HPCS system inoperable.

ACTION 38 With the number of OPERABLE channels less than the Total Number of Channels, declare the associated emergency diesel generator inoperable and take the ACTION required by Specifications 3.8.1.1 or 3.8.1.2, as appropriate.

ACTION 39 - With the number of OPERABLE channels one less than the Total Number of Channels, place the inoperable channel in the tripped condition within 1 hour*; operation may then continue until performance of the next required CHANNEL FUNCTIONAL TEST.

ACTION 40 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within ~~one hour~~ 24 hours. Restore the inoperable channel to OPERABLE status within 7 days or declare the associated system inoperable.

*The provisions of Specification 3.0.4 are not applicable.

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
A. DIVISION I TRIP SYSTEM		
1. RHR-A (LPCI MODE) AND LPCS SYSTEM		
a. Reactor Vessel Water Level - Low Low Low, Level 1	$\geq$ -145.5 in.*	$\geq$ -147.7 in.
b. Drywell Pressure - High	$\leq$ 1.68 psig	$\leq$ 1.88 psig
c. Reactor Vessel Pressure-Low (LPCS and LPCI Injection Valve Permissive)	472 psig	$\geq$ 452 psig, $\leq$ 478 psig
d. LPCI Pump A Start Time Delay Logic Card	5 sec.	5 $\pm$ 0.5 sec.
e. LPCS Pump Discharge Flow - Low ##	$\geq$ 875 gpm	$\geq$ 750 gpm
f. LPCI Pump (A) Discharge Flow - Low ##	$\geq$ 1100 gpm	$\geq$ 900 gpm
g. Manual Initiation	NA	NA
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "1" ADS LOGIC "A" AND "E"		
a. Reactor Vessel Water Level - Low Low Low, Level 1	$\geq$ -145.5 in.*	$\geq$ -147.7 in.
b. Drywell Pressure - High	$\leq$ 1.68 psig	$\leq$ 1.88 psig
c. ADS Timer	$\leq$ 105 sec.	$\leq$ 117 sec.
d. Reactor Vessel Water Level-Low, Level 3	$\geq$ 8.9 in.*	$\geq$ 8.3 in.
e. LPCS Pump Discharge Pressure-High	$\geq$ 145 psig	$\geq$ 125 psig
f. LPCI Pump A Discharge Pressure-High	$\geq$ 125 psig	$\geq$ 115 psig
g. ADS Drywell Pressure Bypass Timer	$\leq$ 6.0 min.	$\leq$ 6.5 min.
h. Manual Inhibit ADS Switch	NA	NA
i. Manual Initiation	NA	NA

TABLE 3.3.3-2 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
B. DIVISION II TRIP SYSTEM		
1. RHR B AND C (LPCI MODE)		
a. Reactor Vessel Water Level - Low Low Low, Level 1	$\geq$ -145.5 in.*	$\geq$ -147.7 in.
b. Drywell Pressure - High	1.68 psig	$\leq$ 1.88 psig
c. Reactor Vessel Pressure-Low (LPCI Injection Valve Permissive)	472 psig	> 452 psig, $\leq$ 478 psig
d. LPCI Pump (B) Start Time Delay Logic Card	5 sec.	5 ± 0.5 sec.
e. LPCI Pump (B) Discharge Flow - Low##	$\geq$ 1100 gpm	$\geq$ 900 gpm
f. LPCI Pump (C) Discharge Flow - Low##	$\geq$ 1100 gpm	$\geq$ 900 gpm
g. Manual Initiation	NA	NA
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "2" ADS LOGIC "B" AND "F"		
a. Reactor Vessel Water Level - Low Low Low, Level 1	$\geq$ -145.5 in.*	$\geq$ -147.7 in.
b. Drywell Pressure - High	$\leq$ 1.68 psig	$\leq$ 1.88 psig
c. ADS Timer	$\leq$ 105 sec.	$\leq$ 117 sec.
d. Reactor Vessel Water Level-Low, Level 3	$\geq$ 8.9 in.*	$\geq$ 8.3 in.
e. LPCI Pump (B and C) Discharge Pressure-High	$\geq$ 125 psig	$\geq$ 115 psig
f. ADS Drywell Pressure Bypass Timer	$\leq$ 6.0 min.	$\leq$ 6.5 min.
g. Manual Inhibit ADS Switch	NA	NA
i. Manual Initiation	NA	NA

TABLE 3.3.3 (continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
C. DIVISION III TRIP SYSTEM		
1. HPCS SYSTEM		
a. Reactor Vessel Water Level - Low Low, Level 2	≥ -45.5 in.*	≥ -47.7 in.
b. Drywell Pressure - High	≤ 1.68 psig	≤ 1.88 psig
c. Reactor Vessel Water Level - High, Level 8	≤ 52.0 in.*	≤ 54.2 in.
d. RCIC Storage Tank Level - Low	≥ 3½ in.**	≥ 0 in.**
e. Suppression Pool Water Level - High	≤ 6½ in.†	≤ 12 in.†
f. HPCS Pump Discharge Pressure - High	≥ 145 psig	≥ 120 psig
g. HPCS System Flow Rate - Low	≥ 625 gpm	≥ 500 gpm
h. Manual Initiation	NA	NA
D. LOSS OF POWER		
1. 4.16-kV Emergency Bus Undervoltage (Loss of Voltage)		
a. Divisions I and II	1. 4.16-kV Basis - 2870±143.5 volts	2870±525 volts
	2. 120-volt Basis - 82±4.1 volts	82±15 volts
	3. ≤ 10 sec. time delay	≤ 10-sec. time delay
b. Division III	1. 4.16-kV Basis - 2520±175 volts	2520+210, -175 volts
	2. 120-volt Basis - 72±5 volts	72+6; -5 volts
	3. ≤ 2.5 ± 0.075-sec. time delay	≤ 3.0-sec. time delay
2. 4.16-kV Emergency Bus Undervoltage (Degraded Voltage)	a. 4.16-kV Basis - 3797±35 volts	3797±35 volts
	b. 120-volt Basis - 108.5±1 volt	108.5±1 volt
	c. 15-sec. ±0.5 sec. time delay	15-sec. ±1.0 sec. time delay

TABLE 3.3.3-2 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TABLE NOTATIONS

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

@ These are inverse time delay voltage relays or instantaneous voltage relays with a time delay. The voltages shown are the maximum that will not result in a trip. For the inverse time relays, lower voltage conditions will result in decreased trip times.

@@ These Trip Functions are not required for ECCS actuation.

** Instrument zero is elevation 739' 10-3/4" msl.

† Instrument zero is elevation 731' 5" msl.

TABLE 3.3.3-3

EMERGENCY CORE COOLING SYSTEM RESPONSE TIMES

ECCS	RESPONSE TIME (Seconds)
1. LOW PRESSURE CORE SPRAY SYSTEM	≤ 37
2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM	
a. Loops A, B and C	≤ 37
3. AUTOMATIC DEPRESSURIZATION SYSTEM	NA
4. HIGH PRESSURE CORE SPRAY SYSTEM	≤ 27
5. LOSS OF POWER	NA

TABLE 4.3.3.1-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
A. DIVISION 1 TRIP SYSTEM				
1. RHR-A (LPCI MODE) AND LPCS SYSTEM				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R(a)	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	S	M → Q	R(a)	1, 2, 3
c. Reactor Vessel Pressure-Low (LPCI and LPCS Injection Valve Permissive)	S	M → Q	R(a)	1, 2, 3, 4*, 5*
d. LPCI Pump A Start Time Delay Logic Card	NA	M → Q	R	1, 2, 3, 4*, 5*
e. LPCS Pump Discharge Flow-Low	S	M → Q	R(a)	1, 2, 3, 4*, 5*
f. LPCI Pump (A) Discharge Flow -Low	S	M → Q	R(a)	1, 2, 3, 4*, 5*
g. Manual Initiation	NA	R	NA	1, 2, 3, 4*, 5*
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "1"#				
ADS LOGIC "A" AND "E"				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R(a)	1, 2, 3
b. Drywell Pressure-High	S	M → Q	R(a)	1, 2, 3
c. ADS Timer	NA	M → Q	R	1, 2, 3
d. Reactor Vessel Water Level - Low, Level 3	S	M → Q	R(a)	1, 2, 3
e. LPCS Pump Discharge Pressure-High	S	M → Q	R(a)	1, 2, 3
f. LPCI Pump A Discharge Pressure-High	S	M → Q	R(a)	1, 2, 3
g. ADS Drywell Pressure Bypass Timer	NA	M → Q	R	1, 2, 3
h. Manual Inhibit ADS Switch	NA	M → Q	NA	1, 2, 3
i. Manual Initiation	NA	R	NA	1, 2, 3

TABLE 4.3.3.1 - (continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
B. DIVISION II TRIP SYSTEM				
1. RHR B AND C (LPCI MODE)				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M→Q	R(a)	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	S	M→Q	R(a)	1, 2, 3
c. Reactor Vessel Pressure-Low (LPCI Injection Valve Permissive)	S	M→Q	R(a)	1, 2, 3, 4*, 5*
d. LPCI Pump B Start Time Delay Logic Card	NA	M→Q	R	1, 2, 3, 4*, 5*
e. LPCI Pump (B) Discharge Flow -Low	S	M→Q	R(a)	1, 2, 3, 4*, 5*
f. LPCI Pump (c) Discharge Flow -Low	S	M→Q	R(a)	1, 2, 3, 4*, 5*
g. Manual Initiation	NA	R	NA	1, 2, 3, 4*, 5*
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "2"# ADS LOGIC "B" AND "F"				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M→Q	R(a)	1, 2, 3
b. Drywell Pressure-High	S	M→Q	R(a)	1, 2, 3
c. ADS Timer	NA	M→Q	R	1, 2, 3
d. Reactor Vessel Water Level - Low, Level 3	S	M→Q	R(a)	1, 2, 3
e. LPCI Pump (B and C) Discharge Pressure-High	S	M→Q	R(a)	1, 2, 3
f. ADS Drywell Pressure Bypass Timer	NA	M→Q	R	1, 2, 3
g. Manual Inhibit ADS Switch	NA	M→Q	NA	1, 2, 3
h. Manual Initiation	NA	R	NA	1, 2, 3

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
C. DIVISION III TRIP SYSTEM				
1. HPCS SYSTEM				
a. Reactor Vessel Water Level - low low, level 2	S	M→Q	R(a)	1, 2, 3, 4*, 5*
b. Drywell Pressure-High	S	M→Q	R(a)	1, 2, 3
c. Reactor Vessel Water Level-High, level 8	S	M→Q	R(a)	1, 2, 3, 4*, 5*
d. RCIC Storage Tank Level - low	S	M→Q	R(a)	1, 2, 3, 4*, 5*
e. Suppression Pool Water Level - High	S	M→Q	R(a)	1, 2, 3, 4*, 5*
f. HPCS Pump Discharge Pressure -High	S	M→Q	R(a)	1, 2, 3, 4*, 5*
g. HPCS System Flow Rate-Low	S	M→Q	R(a)	1, 2, 3, 4*, 5*
h. Manual Initiation	NA	R	NA	1, 2, 3, 4*, 5*
D. LOSS OF POWER				
1. 4.16 kV Emergency Bus Under-voltage (Loss of Voltage)	NA	NA	R	1, 2, 3, 4**, 5**
2. 4.16 kV Emergency Bus Under-voltage (Degraded Voltage)	S	M	R	1, 2, 3, 4**, 5**

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

Not required to be OPERABLE when reactor steam dome pressure is $\leq$ 100 psig.

* When the system is required to be OPERABLE per Specification 3.5.2.

** Required when ESF equipment is required to be OPERABLE.

(a) Calibrate the analog trip module at least once per ~~31~~ 92 days.

Enclosure 2

BWR 6

ECCS Actuation Instrumentation

Technical Specification

INSTRUMENTATION

3/4.3.3 EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3 The emergency core cooling system (ECCS) actuation instrumentation channels shown in Table 3.3.3-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.3-2 and with EMERGENCY CORE COOLING SYSTEM RESPONSE TIME as shown in Table 3.3.3-3.

APPLICABILITY: As shown in Table 3.3.3-1.

ACTION:

a. With an ECCS actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.3-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With one or more ECCS actuation instrumentation channels inoperable, take the ACTION required by Table 3.3.3-1.

c. With either ADS trip system "A" or "B" inoperable, restore the inoperable trip system to OPERABLE status within:

1. 7 days, provided that the HPCS and RCIC systems are OPERABLE; or
2. 72 hours, provided either the HPCS or RCIC system are inoperable.

Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to less than or equal to (100) psig within the following 24 hours.

SURVEILLANCE REQUIREMENTS

4.3.3.1 Each ECCS actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.3.1-1.

4.3.3.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

4.3.3.3 The ECCS RESPONSE TIME of each ECCS trip function shown in Table 3.3.3-3 shall be demonstrated to be within the limit at least once per 18 months. Each test shall include at least one channel per trip system such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific ECCS trip system.

TABLE 3.3.3-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION(a)	APPLICABLE OPERATIONAL CONDITIONS	ACTION
A. DIVISION 1 TRIP SYSTEM			
1. RHR-A (LPCI MODE) & LPCS SYSTEM			
a. Reactor Vessel Water Level - Low Low Low, Level 1	2(b)	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	2(b)	1, 2, 3	30
c. LPCS Pump Discharge Flow-Low (Bypass)	1	1, 2, 3	32
d. Reactor Vessel Pressure-Low (LPCS Permissive) — Injection Valve	(1)	1, 2, 3, 4*, 5*	35
e. Reactor Vessel Pressure-Low (LPCI Permissive) — Injection Valve	(1)	1, 2, 3 4*, 5*	32 33
f. LPCI Pump A Start Time Delay Relay	(1)	1, 2, 3 4*, 5*	32 33
g. LPCI Pump A Discharge Flow-Low (Bypass)	(1)	1, 2, 3, 4*, 5*	32
h. Division 1 Bus Power Monitor	(1)	1, 2, 3, 4*, 5*	35
i. Manual Initiation	(2)	1, 2, 3, 4*, 5*	34
j. _____	(1)/(system)	1, 2, 3, 4*, 5*	35
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "A"	—	----------	—
a. Reactor Vessel Water Level - Low Low Low, Level 1	2(b)	1, 2, 3	30
b. Drywell Pressure - High	2(b)	1, 2, 3	30
c. ADS Timer	1	1, 2, 3	32
d. Reactor Vessel Water Level - Low, Level 3 (Permissive)	(1)	1, 2, 3	32
e. LPCS Pump Discharge Pressure-High (Permissive)	(1)	1, 2, 3	32
f. LPCI Pump A Discharge Pressure-High (Permissive)	(1)	1, 2, 3	32
g. Manual Initiation	(1)/(valve)	1, 2, 3	35
h. _____	—	----------	—

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION(a)	APPLICABLE OPERATIONAL CONDITIONS	ACTION
B. DIVISION 2 TRIP SYSTEM			
1. RHR B & C (LPCI MODE)			
a. Reactor Vessel Water Level - Low Low Low, Level 1	2(b)	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	2(b)	1, 2, 3	30
c. Reactor Vessel Pressure-Low (LPCI Permissive)	(1)/valve	1, 2, 3	32
d. LPCI Pump (B) Start Time Delay Relay	(1)	4*, 5*	33
e. LPCI Pump Discharge Flow - Low (Bypass)	(1)/pump	1, 2, 3, 4*, 5*	32
f. Division 2 Bus Power Monitor	2	1, 2, 3, 4*, 5*	34
g. Manual Initiation	(1)/(system)	1, 2, 3, 4*, 5*	35
h. _____	—	—	—
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "B"			
a. Reactor Vessel Water Level - Low Low Low, Level 1	2(b)	1, 2, 3	30
b. Drywell Pressure - High	2(b)	1, 2, 3	30
c. ADS Timer	(1)	1, 2, 3	32
d. Reactor Vessel Water Level - Low, Level 3 (Permissive)	(1)	1, 2, 3	32
e. LPCI Pump (B and C) Discharge Pressure - High (Permissive)	(1)/pump	1, 2, 3	32
f. Manual Initiation	(1)/(valve)	1, 2, 3	35
g. _____	—	—	—

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION(a)	APPLICABLE OPERATIONAL CONDITIONS	ACTION
C. DIVISION 3 TRIP SYSTEM			
1. HPCS SYSTEM			
a. Reactor Vessel Water Level - (Low, Low, Level 2)	4(b)		
b. Drywell Pressure - High	4(b)	1, 2, 3, 4*, 5*	36
c. Reactor Vessel Water Level-High, Level (8)	4(c)	1, 2, 3	36
d. Condensate Storage Tank Level-Low	2(d)	1, 2, 3, 4*, 5*	32
e. Suppression Pool Water Level-High	2(d)	1, 2, 3, 4*, 5*	37
f. Pump Discharge Pressure-High (Bypass)	(1)	1, 2, 3, 4*, 5*	37 35
g. HPCS System Flow Rate-Low (Permissive)	(1)	1, 2, 3, 4*, 5*	35 35
h. HPCS Bus Power Monitor	(1)	1, 2, 3, 4*, 5*	34
i. Manual Initiation	(1)	1, 2, 3, 4*, 5*	34 35
j. _____	(1)/system	1, 2, 3, 4*, 5*	35

	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM OPERABLE CHANNELS	APPLICABLE OPERATIONAL CONDITIONS	ACTION
D. LOSS OF POWER					
1. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	1/bus	1/bus	1/bus	1, 2, 3, 4**, 5**	38
2. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	3/bus	2/bus	2/bus	1, 2, 3, 4**, 5**	39

(a) A channel may be placed in an inoperable status for up to 6 hours during periods of 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 associated division diesel generator (and the suppression pool makeup system).
(c) Provides signal to close HPCS pump discharge valve only.
(d) Provides signal to HPCS pump suction valves only.
* When the system is required to be OPERABLE per Specification 3.5.2 or 3.5.3.
** Required when ESF equipment is required to be OPERABLE.
# Not required to be OPERABLE when reactor steam dome pressure is less than or equal to (100) psig.
Alarm only.

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

ACTION

ACTION 30 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. With one channel inoperable, place the inoperable channel in the tripped condition within ~~one hour~~* 24 hours or declare the associated system inoperable.
b. With more than one channel inoperable, declare the associated system inoperable.

ACTION 31 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within ~~one~~ 24 hours hour. Restore the inoperable channel to OPERABLE status within 7 days or declare the associated system inoperable.

ACTION 32 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, within 24 hours declare the associated ADS trip system or ECCS inoperable.

ACTION 33 - With the number of OPERABLE channels less than the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within ~~one hour~~ 24 hours.

ACTION 34 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, verify bus power availability at least once per 12 hours or declare the associated ECCS inoperable.

ACTION 35 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within ~~8 hours~~ 24 hours or declare the associated ADS valve or ECCS inoperable.

ACTION 36 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. For one trip system, place that trip system in the tripped condition within ~~one hour~~* 24 hours or declare the HPCS system inoperable.
b. For both trip systems, declare the HPCS system inoperable.

ACTION 37 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within ~~one hour~~* 24 hours or declare the HPCS system inoperable.

ACTION 38 - With the number of OPERABLE channels less than the Total Number of Channels, declare the associated emergency diesel generator inoperable and take the ACTION required by Specification 3.8.1.1 or 3.8.1.2, as appropriate.

ACTION 39 - With the number of OPERABLE channels one less than the Total Number of Channels, place the inoperable channel in the tripped condition within 1 hour*; operation may then continue until performance of the next required CHANNEL FUNCTIONAL TEST.

*The provisions of Specification 3.0.4 are not applicable.

TABLE 3.3.3-2

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
A. DIVISION 1 TRIP SYSTEM		
1. RHR-A (LPCI MODE) AND LPCS SYSTEM		
a. Reactor Vessel Water Level - Low Low Low, Level 1	≥ -(150) inches*	≥ -(152) inches
b. Drywell Pressure - High	≤ (1.89) psig	≤ (1.94) psig
c. LPCS Pump Discharge Flow-Low (Bypass)	≥ ( ) gpm	≥ ( ) gpm
d. Reactor Vessel Pressure-Low (LPCS Injection Valve Permissive)	≥ ( ) psig, decreasing	≥ ( ) psig, decreasing
e. Reactor Vessel Pressure-Low (LPCI Injection Valve Permissive)	≥ ( ) psig, decreasing	≥ ( ) psig, decreasing
f. LPCI Pump A Start Time Delay Relay	≤ (5) seconds	≤ ( ) seconds
g. LPCI Pump A Discharge Flow-Low	≥ ( ) gpm	≥ ( ) gpm
h. Division 1 Bus Power Monitor	≥ ( ) [volts]	≥ ( ) [volts]
i. Manual Initiation	NA	NA
j. _____	_____	_____
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "A"		
a. Reactor Vessel Water Level - Low Low Low, Level 1	≥ -(150) inches*	≥ -(152) inches
b. Drywell Pressure - High	≤ (1.89) psig	≤ (1.94) psig
c. ADS Timer	≥ 90 and ≤ ( ) seconds	≥ 90 and ≤ ( ) seconds
d. Reactor Vessel Water Level-Low, Level 3	≥ (11.4) inches*	≥ (10.8) inches
e. LPCS Pump Discharge Pressure-High	≥ (145) psig, increasing	≥ (140) psig, increasing
f. LPCI Pump A Discharge Pressure-High	≥ (125) psig, increasing	≥ (122) psig, increasing
g. Manual Initiation	NA	NA
h. _____	_____	_____

TABLE 3.3.3-2 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
B. DIVISION 2 TRIP SYSTEM		
1. RHR B AND C (LPCI MODE)		
a. Reactor Vessel Water Level - Low Low Low, Level 1	≥ -(150) inches*	≥ -(152) inches
b. Drywell Pressure - High	≤ (1.89) psig	≤ (1.94) psig
c. Reactor Vessel Pressure-Low (LPCI Injection Permissive)	≥ ( ) psig, decreasing	≥ ( ) psig, decreasing
d. LPCI Pump (B) Start Time Delay Relay	≤ (5) seconds	≤ ( ) seconds
e. LPCI Pump Discharge Flow-Low	≥ ( ) gpm	≥ ( ) gpm
f. Division 2 Bus Power Monitor	≥ ( ) (volts)	≥ ( ) (volts)
g. Manual Initiation	NA	NA
h. _____	—	—
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "B"		
a. Reactor Vessel Water Level - Low Low Low, Level 1	≥ -(130) inches*	≥ -(152) inches
b. Drywell Pressure - High	≤ (1.89) psig	≤ (1.94) psig
c. ADS Timer	≥ 90 and ≤ ( ) seconds	≥ 90 and ≤ ( ) seconds
d. Reactor Vessel Water Level-Low, Level 3	≥ (11.4) inches*	≥ (10.8) inches
e. LPCI Pump (B and C) Discharge Pressure-High	≥ (125) psig, increasing	≥ (125) psig, increasing
f. Manual Initiation	NA	NA
g. _____	—	—

TABLE 3.3.3-2 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
C. DIVISION 3 TRIP SYSTEM		
1. HPCS SYSTEM		
a. Reactor Vessel Water Level - (Low Low, Level 2)	≥ -(51) inches*	≥ -(53) inches
b. Drywell Pressure - High	≤ (1.89) psig	≤ (1.94) psig
c. Reactor Vessel Water Level - High, Level (8)	≤ (52) inches*	≤ (52.6) inches
d. Condensate Storage Tank Level - Low	≥ (X+3) inches**	≥ (X) inches**
e. Suppression Pool Water Level - High	≤ (Y-3) inches@	≤ (Y) inches@
f. Pump Discharge Pressure - High	≥ ( ) psig	≥ ( ) psig
g. HPCS System Flow Rate - Low	≥ ( ) gpm	≥ ( ) gpm
h. HPCS Bus Power Monitor	≥ ( ) volts	≥ ( ) volts
i. Manual Initiation	NA	NA
j. _____	—	—
D. LOSS OF POWER		
1. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage) ##		
a. 4.16 kv Basis -	(2940)±(161) volts	(2940)±(315) volts
b. 120 v Basis -	(84)±(4.6) volts	(84)±(9) volts
c.	≤ (10) sec. time delay	≤ (10) sec. time delay
2. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)		
a. 4.16 kv Basis -	(3727)±(9) volts	(3727)±(21) volts
b. 120 v Basis -	(106.5)±(0.25) volts	(106.5)±(0.60) volts
c.	(10)±(0.5) sec. time delay	(10)±(1) sec. time delay

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

**X is value that ensures adequate NPSH and precludes air entry due to vortexing.

@Y is (5) inches above normal water level.

##These are inverse time delay voltage relays or instantaneous voltage relays with a time delay. The voltages shown are the maximum that will not result in a trip. Lower voltage conditions will result in decreased trip times.

TABLE 3.3.3-3

EMERGENCY CORE COOLING SYSTEM RESPONSE TIMES

ECCS	RESPONSE TIME (Seconds)
1. LOW PRESSURE CORE SPRAY SYSTEM	≤ (40)
2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM	
a. Pumps A and B	≤ (45)
b. Pump C	≤ (40)
3. AUTOMATIC DEPRESSURIZATION SYSTEM	NA
4. HIGH PRESSURE CORE SPRAY SYSTEM	≤ (27)
5. LOSS OF POWER	N.A.

TABLE 4.3.3.1-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
A. DIVISION 1 TRIP SYSTEM				
1. RHR-A (LPCI MODE) AND LPCS SYSTEM				
a. Reactor Vessel Water Level - low low low, level 1	S	M → Q	R(a)	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	S	M → Q	R(a)	1, 2, 3
c. LPCS Pump Discharge Flow-Low	S	M → Q	R	1, 2, 3, 4*, 5*
d. Reactor Vessel Pressure-Low (LPCS Initiation Permissive)	S	M → Q	R	1, 2, 3, 4*, 5*
e. Reactor Vessel Pressure-Low (LPCI Initiation Permissive)	S	M → Q	R	1, 2, 3, 4*, 5*
f. LPCI Pump A Start Time Delay Relay	NA	M → Q	Q	1, 2, 3, 4*, 5*
g. LPCI Pump A Flow-Low	S	M → Q	R	1, 2, 3, 4*, 5*
h. Division 1 Bus Power Monitor	NA	M → Q	NA	1, 2, 3, 4*, 5*
i. Manual Initiation	NA	M → Q	NA	1, 2, 3, 4*, 5*
j. _____	—	—	—	_____
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "A"				
a. Reactor Vessel Water Level - low low low, level 1	S	M → Q	R(a)	1, 2, 3
b. Drywell Pressure-High	S	M → Q	R(a)	1, 2, 3
c. ADS Timer	NA	M → Q	Q	1, 2, 3
d. Reactor Vessel Water Level - Low, Level 3	S	M → Q	R(a)	1, 2, 3
e. LPCS Pump Discharge Pressure-High	S	M → Q	R	1, 2, 3
f. LPCI Pump A Discharge Pressure-High	S	M → Q	R(a)	1, 2, 3
g. Manual Initiation	NA	M → Q	NA	1, 2, 3
h. _____	—	—	—	_____

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
B. DIVISION 2 TRIP SYSTEM				
1. RHR B AND C (LPCI MODE)				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R(a)	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	S	M → Q	R(a)	1, 2, 3
c. Reactor Vessel Pressure-Low (LPCI Injection Valve Permissive)	S	M → Q	R	1, 2, 3, 4*, 5*
d. LPCI Pump (B) Start Time Delay Relay	NA	M → Q	Q	1, 2, 3, 4*, 5*
e. LPCI Pump Discharge Flow-Low	S	M → Q	R	1, 2, 3, 4*, 5*
f. Division 2 Bus Power Monitor	NA	M → Q	NA	1, 2, 3, 4*, 5*
g. Manual Initiation	NA	M(b) → DPT → Q	NA	1, 2, 3, 4*, 5*
h. _____	—	—	—	—
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "B"				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R(a)	1, 2, 3
b. Drywell Pressure-High	S	M → Q	R(a)	1, 2, 3
c. ADS Timer	NA	M → Q	Q	1, 2, 3
d. Reactor Vessel Water Level - Low, Level 3	S	M → Q	R(a)	1, 2, 3
e. LPCI Pump (B and C) Discharge Pressure-High	S	M(b) → DPT → Q	R(a)	1, 2, 3
f. Manual Initiation	NA	—	NA	1, 2, 3
g. _____	—	—	—	—

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
C. DIVISION 3 TRIP SYSTEM				
1. HPCS SYSTEM				
a. Reactor Vessel Water Level - (low low, level 2)	S	M → Q	R(a)	1, 2, 3, 4*, 5*
b. Drywell Pressure-High	S	M → Q	R(a)	1, 2, 3
c. Reactor Vessel Water Level-High, Level (8)	S	M → Q	R(a)	1, 2, 3, 4*, 5*
d. Condensate Storage Tank Level - Low	S	M → Q	R(a)	1, 2, 3, 4*, 5*
e. Suppression Pool Water Level - High	S	M → Q	R(a)	1, 2, 3, 4*, 5*
f. Pump Discharge Pressure-High	S	M → Q	R	1, 2, 3, 4*, 5*
g. HPCS System Flow Rate-Low	S	M → Q	R	1, 2, 3, 4*, 5*
h. HPCS Bus Power Monitor	NA	M → Q	NA	1, 2, 3, 4*, 5*
i. Manual Initiation	NA	M(b) → Q	NA	1, 2, 3, 4*, 5*
D. LOSS OF POWER				
1. 4.16 kv Emergency Bus Under-voltage (Loss of Voltage)	NA	NA	R	1, 2, 3, 4**, 5**
2. 4.16 kv Emergency Bus Under-voltage (Degraded Voltage)	S	M	R	1, 2, 3, 4**, 5**

\# Not required to be OPERABLE when reactor steam dome pressure is less than or equal to (100) psig.

* When the system is required to be OPERABLE per Specification 3.5.2.

** Required when ESF equipment is required to be OPERABLE.

(a) Calibrate trip unit at least once per ~~92~~ days. 92

(b) Manual initiation switches shall be tested at least once per 18 months during shutdown. All other circuitry associated with manual initiation shall receive a CHANNEL FUNCTIONAL TEST at least once per 31 days as a part of circuitry required to be tested for automatic system actuation.

Enclosure 3

BWR 5

ECCS Actuation Instrumentation

Technical Specification

3/4.3.3 EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3 The emergency core cooling system (ECCS) actuation instrumentation channels shown in Table 3.3.3-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.3-2 and with EMERGENCY CORE COOLING SYSTEM RESPONSE TIME as shown in Table 3.3.3-3.

APPLICABILITY: As shown in Table 3.3.3-1.

ACTION:

a. With an ECCS actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.3-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With one or more ECCS actuation instrumentation channels inoperable, take the ACTION required by Table 3.3.3-1.

c. With ADS trip system "A" or "B" inoperable, restore the inoperable trip system to OPERABLE status within 8 hours or be in at least HOT SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to less than or equal to (100) psig within the following 24 hours.

d. The provisions of Specification 3.0.3 are not applicable in OPERATIONAL CONDITION 5.

SURVEILLANCE REQUIREMENTS

4.3.3.1 Each ECCS actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.3.1-1.

4.3.3.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

4.3.3.3 The ECCS RESPONSE TIME of each ECCS function shown in Table 3.3.3-3 shall be demonstrated to be within the limit at least once per 18 months. Each test shall include at least one logic train such that both logic trains are tested at least once per 36 months and one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific ECCS function.

TABLE 3.3.3-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP (SYSTEM) (FUNCTION)[a]	APPLICABLE OPERATIONAL CONDITIONS	ACTION
A. DIVISION 1 TRIP SYSTEM			
1. RHR-A (LPCI MODE) & LPCS SYSTEM			
a. Reactor Vessel Water Level - Low Low Low, Level 1	(2)[b]	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	(2)[b]	1, 2, 3	30
c. LPCS Pump Discharge Flow-Low (Bypass)	(1)	1, 2, 3, 4*, 5*	31
d. LPCS Injection Valve Differential Pressure-Low (Permissive)	(1)	1, 2, 3, 4*, 5*	31
e. LPCI Injection Valve Differential Pressure-Low (Permissive)	(1)	1, 2, 3, 4*, 5*	31
f. LPCI Pump Start Time Delay Relay	1	1, 2, 3, 4*, 5*	31
g. LPCI Pump Discharge Flow-Low (Bypass)	(1)	1, 2, 3, 4*, 5*	31
(h. Division 1 Bus Power Monitor##	(2)	1, 2, 3, 4*, 5*	(32))
i. Manual Initiation	(1)/(system)	1, 2, 3, 4*, 5*	(33)
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "A"#			
a. Reactor Vessel Water Level - Low Low Low, Level 1 coincident with	2[b]	1, 2, 3	30
b. Drywell Pressure - High	2[b][c]	1, 2, 3	30
c. ADS Timer	1	1, 2, 3	31
d. Reactor Vessel Water Level - Low, Level 3 (Permissive)	(1)	1, 2, 3	31
e. LPCS Pump Discharge Pressure-High (Permissive)	(2)	1, 2, 3	31
f. LPCI Pump Discharge Pressure-High (Permissive)	(2)	1, 2, 3	31
g. Manual Initiation	(1)/(valve)	1, 2, 3	(33)

TABLE 3.3.3-1 (Cont'd)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP (SYSTEM) (FUNCTION)[a]	APPLICABLE OPERATIONAL CONDITIONS	ACTION
B. DIVISION 2 TRIP SYSTEM			
1. RHR B (LPCI MODE)			
a. Reactor Vessel Water Level - Low Low Low, Level 1	(2)[b]	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	(2)[b]	1, 2, 3	30
c. LPCI Injection Valve Differential Pressure-Low (Permissive)	(1)/valve	1, 2, 3, 4*, 5*	31
d. LPCI Pump B Start Time Delay Relay	1	1, 2, 3, 4*, 5*	31
e. LPCI Pump Discharge Flow-Low (Bypass)	(1)/(pump)	1, 2, 3, 4*, 5*	31
f. Division I Bus Power Monitor	(2)	1, 2, 3, 4*, 5*	(32)
g. Manual Initiation	(1)/(system)	1, 2, 3, 4*, 5*	(33)
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "B"			
a. Reactor Vessel Water Level - Low Low Low, Level 1 coincident with	2[b]	1, 2, 3	30
b. Drywell Pressure - High	2[b][c]	1, 2, 3	30
c. ADS Timer	1	1, 2, 3	31
d. Reactor Vessel Water Level - Low, Level 3 (Permissive)	(1)	1, 2, 3	31
e. LPCI Pump Discharge Pressure Pressure-High (Permissive)	(2)/(pump)	1, 2, 3	31
f. Manual Initiation	(1)/(valve)	1, 2, 3	(33)

TABLE 3.3.3-1 (Cont'd)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP (SYSTEM)[a] (FUNCTION)	APPLICABLE OPERATIONAL CONDITIONS	ACTION
C. DIVISION 3 TRIP SYSTEM			
1. HPCS SYSTEM			
a. Reactor Vessel Water Level - (Low, Low, Level 2)	(2)(4)[b][c]	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	(2)(4)[b][c]	1, 2, 3	30
c. Reactor Vessel Water Level-High	2[d]	1, 2, 3, 4*, 5*	31
d. Condensate Storage Tank Level-Low	2[e]	1, 2, 3, 4*, 5*	34
e. Suppression Pool Water Level-High	2[e]	1, 2, 3, 4*, 5*	34
f. Pump Discharge Pressure-High (Bypass)	(1)	1, 2, 3, 4*, 5*	31
g. HPCS System Flow Rate-Low (Permissive)	(1)	1, 2, 3, 4*, 5*	31
(h. HPCS Bus Power Monitor ##	(1)	1, 2, 3, 4*, 5*	32)
i. Manual Initiation	(1)/(system)	1, 2, 3, 4*, 5*	(33)

	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE OPERATIONAL CONDITIONS	ACTION
D. LOSS OF POWER					
1. 4.16 kv Emergency bus Under-voltage (Loss of Voltage)	1/bus	1/bus	1/bus	1, 2, 3, 4**, 5**	35
2. 4.16 kv Emergency Bus Under-voltage (Degraded Voltage)	3/bus	2/bus	2/bus	1, 2, 3, 4**, 5**	36

(a) A channel may be placed in an inoperable status for up to 6 hours during periods of 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 associated division diesel generator.
(c) Also actuates standby gas treatment system.
(d) Provides signal to close HPCS pump discharge valve only on 2-out-of-2 logic.
(e) Provides signal to HPCS pump suction valves only.
* Applicable when the system is required to be OPERABLE per Specification 3.5.2 or 3.5.3.
** Required when ESF equipment is required to be OPERABLE.
# Not required to be OPERABLE when reactor steam dome pressure is ≤ (100) psig.
Alarm only.

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

ACTION

ACTION 30 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip (System) (Function) requirement:

(For "per Trip System")

a. For one trip system, place at least one inoperable channel in the tripped condition within ~~one hour*~~ 24 hours or declare the associated ADS trip system or ECCS inoperable.

b. For both trip systems, declare the associated ADS trip system or ECCS inoperable.

(For "per Trip Function")

a. For the LPCS system and the LPCI mode of the RHR system, declare the associated LPCS and/or LPCI systems inoperable.

b. For the HPCS system and the ADS:

1. With one channel inoperable, place the inoperable channel in the tripped condition within ~~one hour*~~ or declare the HPCS system and associated ADS trip system inoperable. 24 hours

2. With more than one channel inoperable, declare the HPCS system and the associated ADS trip system(s) inoperable.

ACTION 31 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, within 24 hours declare the associated ADS trip system or ECCS inoperable.

ACTION 32 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, verify bus power availability at least once per 12 hours or declare the associated ECCS inoperable.

ACTION 33 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, restore the inoperable channel to OPERABLE status within ~~1 hour*~~ or declare the associated ADS valve or ECCS inoperable. 24 hours

ACTION 34 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, place at least one inoperable channel in the tripped condition within ~~one hour*~~ 24 hours or declare the HPCS system inoperable.

*The provisions of Specification 3.0.4 are not applicable.

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

ACTION (Continued)

ACTION 35 - With the number of OPERABLE channels less than the Total Number of Channels, declare the associated emergency diesel generator inoperable and take the ACTION required by Specification 3.8.1.1 or 3.8.1.2, as appropriate.

ACTION 36 - With the number of OPERABLE channels one less than the Total Number of Channels, place the inoperable channel in the tripped condition within 1 hour*; operation may then continue until performance of the next required CHANNEL FUNCTIONAL TEST.

*The provisions of Specification 3.0.4 are not applicable.

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TABLE 3.3.3-2

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
A. DIVISION 1 TRIP SYSTEM		
1. RHR-A (LPCI MODE) AND LPCS SYSTEM		
a. Reactor Vessel Water Level - Low Low Low, Level 1	$\geq$-(130) inches*	$\geq$-(137) inches*
b. Drywell Pressure - High	$\leq$ (1.69) psig	$\leq$ (1.89) psig
c. LPCS Pump Discharge Flow-Low	$\geq$ (640) gpm	$\geq$ (520) gpm
d. LPCI Injection Valve Differential Pressure-Low	$\geq$ (729) psid, decreasing	$\geq$ (709) psig, decreasing
e. LPCI Injection Valve Differential Pressure-Low	$\geq$ (729) psid, decreasing	$\geq$ (705) psid, decreasing
f. LPCI Pump Start Time Delay Relay	$\leq$ (5) seconds	$\leq$ ( ) seconds
g. LPCI Pump Discharge Flow-Low	$\geq$ (550) gpm	$\geq$ ( ) gpm
h. Division I Bus Power Monitor	$\geq$ ( ) (volts)	$\geq$ ( ) (volts))
i. Manual Initiation	NA	NA
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "A"		
a. Reactor Vessel Water Level - Low Low Low, Level 1	$\geq$-(130) inches*	$\geq$-(137) inches*
b. Drywell Pressure - High	$\leq$ (1.69) psgi	$\leq$ (1.89) psig
c. ADS Timer ($\geq$ 90,)	$\leq$ (105) seconds ($\geq$ 90,)	$\leq$ (117) seconds
d. Reactor Vessel Water Level-Low, Level 3	$\geq$ (12.5) inches*	$\geq$ (11) inches*
e. LPCS Pump Discharge Pressure-High	$\geq$ (146) psig, increasing	$\geq$ (136) psig, increasing
f. LPCS Pump Discharge Pressure-High	$\geq$ (114) psig, increasing	$\geq$ (106) psig, increasing
g. Manual Initiation	NA	NA

TABLE 3.3.3-2 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
B. DIVISION 2 TRIP SYSTEM		
1. RHR B AND C (LPCI MODE)		
a. Reactor Vessel Water Level - Low Low Low, Level 1	≥ -(130) inches*	≥ -(137) inches*
b. Drywell Pressure - High	≤ (1.69) psig	≤ (1.89) psig
c. LPCI Injection Valve Differential Pressure-Low	≥ (729) psid, (decreasing)	≥ (709) psig, (decreasing)
d. LPCI Pump B Start Time Delay Relay	≤ (5) seconds	≤ ( ) seconds
e. LPCI Pump Discharge Flow-Low	≥ (550) gpm	≥ ( ) gpm
(f. Division I Bus Power Monitor	≥ ( ) (volts)	≥ ( ) (volts))
g. Manual Initiation	NA	NA
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "B"		
a. Reactor Vessel Water Level - Low Low Low, Level 1	≥ -(130) inches*	≥ -(137) inches*
b. Drywell Pressure - High	≤ (1.69) psgi	≤ (1.89) psig
c. ADS Timer (≥ 90,)	≤ (105) seconds (≥ 90,)	≤ (117) seconds
d. Reactor Vessel Water Level-Low, Level 3	≥ (12.5) inches*	≥ (11) inches*
e. LPCI Pump Discharge Pressure-High	≥ (146) psig, increasing	≥ (136) psig, increasing
f. Manual Initiation	NA	NA

TABLE 3.3.3-2 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
C. DIVISION 3 TRIP SYSTEM		
1. HPCS SYSTEM		
a. Reactor Vessel Water Level - (Low Low, Level 2)	≥ -(50) inches*	≥ -(57) inches*
b. Drywell Pressure - High	≤ (1.69) psig	≤ (1.89) psig
c. Reactor Vessel Water Level - High	≤ (55.5) inches*	≤ ( ) inches*
d. Condensate Storage Tank Level - Low	≥ (X+3) inches**	≥ (X) inches**
e. Suppression Pool Water Level - High	≤ (Y-3) inches#	≤ (Y) inches#
f. Pump Discharge Pressure - High (Bypass)	≥ ( ) psig	≥ ( ) psig
g. HPCS System Flow Rate - Low (Permissive)	≥ ( ) gpm	≥ ( ) gpm
(h. Division 3 Bus Power Monitor	≥ ( ) (volts)	≥ ( ) (volts))
i. Manual Intiation	NA	NA
D. LOSS OF POWER		
1. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage (##))	a. 4.16 kv Basis - (2940)±(161) volts b. 120 v Basis - (84)±(4.6) volts c. ≤ (10) sec. time delay	(2940)±(315) volts (84)±(9) volts ≤ (10) sec. time delay
2. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	a. 4.16 kv Basis - (3727)±(9) volts b. 120 v Basis - (106.5)±(0.25) volts c. (10)±(0.5) sec. time delay	(3727)±(21) volts (106.5)±(0.6)) volts (10)±(1.0) sec. time delay

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

(** X is equivalent to ( ) gallons of water in the condensate storage tank, a value at which the pump will not cavitate.)

(# Y is (5) inches above normal water level of _____.)

(## These are inverse time delay voltage relays or instantaneous voltage relays with a time delay. The voltages shown are the maximum that will not result in a trip. Lower voltage conditions will result in decreased trip times.)

TABLE 3.3.3-3

EMERGENCY CORE COOLING SYSTEM RESPONSE TIMES

ECCS	RESPONSE TIME (Seconds)
1. LOW PRESSURE CORE SPRAY SYSTEM	≤ (40)
2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM	
a. Pumps A and B	≤ (45)
b. Pump C	≤ (40)
3. AUTOMATIC DEPRESSURIZATION SYSTEM	NA
4. HIGH PRESSURE CORE SPRAY SYSTEM	≤ (27)
5. LOSS OF POWER	NA

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
A. DIVISION I TRIP SYSTEM				
1. RHR-A (LPCI MODE) AND LPCS SYSTEM				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	(S)	M → Q	(R)	1, 2, 3
c. LPCS Pump Discharge Flow-Low	(S)	M → Q	(R)	1, 2, 3, 4*, 5*
d. LPCS Injection Valve Differential Pressure-Low	S	M → Q	R	1, 2, 3, 4*, 5*
e. LCPI Injection Valve Differential Pressure-Low	S	M → Q	R	1, 2, 3, 4*, 5*
f. LPCI Pump Start Time Delay Relay	NA	M[(a)] → Q	Q	1, 2, 3, 4*, 5*
g. LPCI Pump Flow-Low	NA	M → Q	Q	1, 2, 3, 4*, 5*
(h. Division I Bus Power Monitor	NA	M → Q	(NA)	1, 2, 3, 4*, 5*)
i. Manual Initiation	NA	M[(b)] → Q	NA	1, 2, 3, 4*, 5*
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "A"				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R	1, 2, 3
b. Drywell Pressure-High	(S)	M → Q	(R)	1, 2, 3
c. ADS Timer	NA	M[(a)] → Q	Q	1, 2, 3
d. Reactor Vessel Water Level - Low, Level 3	S	M → Q	R	1, 2, 3
e. LPCS Pump Discharge Pressure-High	NA	M → Q	Q	1, 2, 3
f. LPCI Pump Discharge Pressure-High	(S)	M → Q	(R)	1, 2, 3
g. Manual Initiation	NA	M[(b)] → Q	NA	1, 2, 3

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
B. DIVISION 2 TRIP SYSTEM				
1. RHR B AND C (LPCI MODE)				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	(S)	M → Q	(R)	1, 2, 3
c. LPCI Injection Valve Differential Pressure-Low	S	M → Q	R	1, 2, 3, 4*, 5*
d. LPCI Pump B Start Time Delay Relay	NA	M → Q	Q	1, 2, 3, 4*, 5*
e. LPCI Pump Discharge Flow-Low	NA	M → Q	Q	1, 2, 3, 4*, 5*
(f. Division 2 Bus Power Monitor	NA	M → Q	(NA)	1, 2, 3, 4*, 5*)
g. Manual Initiation	NA	M(b) → Q	NA	1, 2, 3, 4*, 5*
2. AUTOMATIC DEPRESSURIZATION SYSTEM TRIP SYSTEM "B"				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R	1, 2, 3
b. Drywell Pressure-High	(S)	M → Q	(R)	1, 2, 3
c. ADS Timer	NA	M(a) → Q	Q	1, 2, 3
d. Reactor Vessel Water Level - Low, Level 3	S	M → Q	R	1, 2, 3
e. LPCI Pump Discharge Pressure-High	(S)	M → Q	(R)	1, 2, 3
f. Manual Initiation	NA	M(b) → Q	NA	1, 2, 3

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
C. DIVISION 3 TRIP SYSTEM				
1. HPCS SYSTEM				
a. Reactor Vessel Water Level - (Low Low, Level 2	S	M→Q	R	1, 2, 3, 4*, 5*
b. Drywell Pressure-High	(S)	M→Q	(R)	1, 2, 3
c. Reactor Vessel Water Level-High	NA	M→Q	Q	1, 2, 3, 4*, 5*
d. Condensate Storage Tank Level - Low	(S)	M→Q	(R)	1, 2, 3, 4*, 5*
e. Suppression Pool Water Level - High	(S)	M→Q	(R)	1, 2, 3, 4*, 5*
f. Pump Discharge Pressure-High	NA	M→Q	Q	1, 2, 3, 4*, 5*
g. HPCS System Flow Rate-Low	NA	M→Q	Q	1, 2, 3, 4*, 5*
(h. Division 3 Bus Power Monitor	NA	M→Q	(NA)	1, 2, 3, 4*, 5*)
i. Manual Initiation	NA	M(b)→Q	NA	1, 2, 3, 4*, 5*
D. LOSS OF POWER				
1. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	NA	NA	R	1, 2, 3, 4**, 5**
2. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	S	M	R	1, 2, 3, 4**, 5**

Not required to be OPERABLE when reactor steam dome pressure is less than or equal to (300) psig.
* When the system is required to be OPERABLE per Specification 3.5.1, 3.5.2 or 3.5.3.
** Required when EFS equipment is required to be OPERABLE.
(a) During test of logic.
(b) Manual initiation switches shall be tested at least once per 18 months during shutdown. All other circuitry associated with manual initiation shall receive a CHANNEL FUNCTIONAL TEST at least once per 31 days as part of circuitry required to be tested for automatic system actuation. 92

Enclosure 4

BWR 4

ECCS Actuation Instrumentation

Technical Specification

INSTRUMENTATION

3/4.3.3 EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3 The emergency core cooling system (ECCS) actuation instrumentation channels shown in Table 3.3.3-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.3-2 and with EMERGENCY CORE COOLING SYSTEM RESPONSE TIME as shown in Table 3.3.3-3.

APPLICABILITY: As shown in Table 3.3.3-1.

ACTION:

a. With an ECCS actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.3-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With one or more ECCS actuation instrumentation channels inoperable, take the ACTION required by Table 3.3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.3.1 Each ECCS actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.3.1-1.

4.3.3.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

4.3.3.3 The ECCS RESPONSE TIME of each ECCS trip function shown in Table 3.3.3-3 shall be demonstrated to be within the limit at least once per 18 months. Each test shall include at least one channel per trip system such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific ECCS trip system.

TABLE 3.3.3-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION[a]	APPLICABLE OPERATIONAL CONDITIONS	ACTION
1. CORE SPRAY SYSTEM			
a. Reactor Vessel Water Level - Low Low Low, Level 1	(2)((b))	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	(2)((b))	1, 2, 3	30
c. Reactor Vessel Pressure - Low (Permissive)	2	1, 2, 3	31
d. CSS Pump Discharge Flow - Low (Bypass)	1/pump	4*, 5*	32
e. Manual Initiation	(1)/(subsystem)	1, 2, 3, 4*, 5*	33
f. _____	—	1, 2, 3, 4*, 5*	34
2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM		_____	—
a. Reactor Vessel Water Level - Low Low Low, Level 1	(2)	1, 2, 3, 4*, 5*	30
b. Drywell Pressure - High	(2)	1, 2, 3	30
c. Reactor Vessel Pressure - Low (Permissive)	2	1, 2, 3	31
d. LPCI Pump Discharge Flow - Low (Bypass)	1/pump	4*, 5*	32
e. Manual Initiation	(1)/(subsystem)	1, 2, 3, 4*, 5*	33
f. _____	—	1, 2, 3, 4*, 5*	34
3. HIGH PRESSURE COOLANT INJECTION SYSTEM#		_____	—
a. Reactor Vessel Water Level - (Low Low Level 2)	4	1, 2, 3	35
b. Drywell Pressure - High	4	1, 2, 3	35
c. Condensate Storage Tank Level - Low	2(c)	1, 2, 3	36
d. Suppression Pool Water Level - High	2	1, 2, 3	36
e. Reactor Vessel Water Level - High, Level (8)	2(d)	1, 2, 3	31
f. HPCI Pump Discharge Flow - Low (Bypass)	1	1, 2, 3	33
g. Manual Initiation	(1)/(system)	1, 2, 3	34
h. _____	—	_____	—

TABLE 3.3.3-1 (Cont'd)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

TRIP FUNCTION		MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION(a)	APPLICABLE OPERATIONAL CONDITIONS	ACTION
4.	AUTOMATIC DEPRESSURIZATION SYSTEM#			
a.	Reactor Vessel Water Level - Low Low Low, Level 1	(2)	1, 2, 3	30
b.	Drywell Pressure - High	(2)	1, 2, 3	30
c.	ADS Timer	(1)	1, 2, 3	31
d.	Core Spray Pump Discharge Pressure - High (Permissive)	(1)/loop	1, 2, 3	31
e.	RHR LPCI Mode Pump Discharge Pressure - High (Permissive)	(1)/(loop)	1, 2, 3	31
f.	Reactor Vessel Water Level - Low, Level 3 (Permissive)	(1)	1, 2, 3	31
g.	Manual Initiation	(1)/(valve)	1, 2, 3	34
h.	_____	_____	_____	—

		TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE OPERATIONAL CONDITIONS	ACTION
5.	LOSS OF POWER					
1.	4.16 kv Emergency Bus Under-voltage (Loss of Voltage)	1/bus	1/bus	1/bus	1, 2, 3, 4**, 5**	37
2.	4.16 kv Emergency Bus Under-voltage (Degraded Voltage)	3/bus	2/bus	2/bus	1, 2, 3, 4**, 5**	38

(a) A channel may be placed in an inoperable status for up to 6 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) Also actuates the associated emergency diesel generators.

(c) One trip system. Provides signal to HPCI pump suction valves only.

(d) On 2 out of 2 logic, provides a signal to (close) (trip) HPCI pump (discharge valve) (turbine) only.

* When the system is required to be OPERABLE per Specification 3.5.2.

\# Not required to be OPERABLE when reactor steam dome pressure is less than or equal to (100) psig.

** Required when ESF equipment is required to be OPERABLE.

TABLE 3.3.3-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION

ACTION

ACTION 30 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. With one channel inoperable, place the inoperable channel in the tripped condition within ~~one hour~~* or declare the associated system inoperable. 24 hours

b. With more than one channel inoperable, declare the associated system inoperable.

ACTION 31 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, declare the associated ECCS inoperable within 24 hours

ACTION 32 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within ~~one hour~~. 24 hours

ACTION 33 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within ~~one hour~~; restore the inoperable channel to OPERABLE status within 7 days or declare the associated system inoperable. 24 hours

ACTION 34 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within ~~6 hours~~ or declare the associated ECCS inoperable. 24 hours

ACTION 35 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement:

a. For one trip system, place that trip system in the tripped condition within ~~one hour~~* or declare the HPCI system inoperable. 24 hours

b. For both trip systems, declare the HPCI system inoperable.

ACTION 36 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within ~~one hour~~* or declare the HPCI system inoperable. 24 hours

ACTION 37 - With the number of OPERABLE channels less than the Total Number of Channels, declare the associated emergency diesel generator inoperable and take the ACTION required by Specification 3.8.1.1 or 3.8.1.2, as appropriate.

ACTION 38 - With the number of OPERABLE channels one less than the Total Number of Channels, place the inoperable channel in the tripped condition within 1 hour;* operation may then continue until performance of the next required CHANNEL FUNCTIONAL TEST.

*The provisions of Specification 3.0.4 are not applicable.

TABLE 3.3.3-2

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
1. CORE SPRAY SYSTEM		
a. Reactor Vessel Water Level - Low Low Low, Level 1	≥(-129) inches*	≥(-136) inches
b. Drywell Pressure - High	≤ (1.69) psig	≤ (1.89) psig
c. Reactor Vessel Pressure - Low	≥(455) psig,(decreasing)	≥ (435) psig, (decreasing)
d. CSS Pump Discharge Flow - Low	≥ ( ) gpm	≥ ( ) gpm
e. Manual Initiation	NA	NA
f. _____	___	___
2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM		
a. Reactor Vessel Water Level - Low Low Low, Level 1	≥(-129) inches*	≥(-136) inches
b. Drywell Pressure - High	≤ (1.69) psgi	≤ (1.89) psig
c. Reactor Vessel Pressure - Low	≥(455) psig,(decreasing)	≤ (435) psig, (decreasing)
d. LPCI Pump Discharge Flow -Low	≥ ( ) gpm	≥ ( ) gpm
e. Manual Initiation	NA	NA
f. _____	___	___
3. HIGH PRESSURE COOLANT INJECTION SYSTEM		
a. Reactor Vessel Water Level - (Low Low, Level 2)	≥-(38) inches*	≥-(45) inches
b. Drywell Pressure - High	≤ (1.69) psig	≤ (1.89) psig
c. Condensate Storage Tank Level - Low	≥ (x+3) inches (#)	≥ (X) inches (#)
d. Suppression Pool Water Level - High	≤ (Y-3) inches (##)	≤ (Y) inches (##)
e. Reactor Vessel Water Level - High, Level 8	≤ (54) inches	≤ (55.5) inches
f. HPCI Pump Discharge Flow - Low	≥ ( ) gpm	≥ ( ) gpm
g. Manual Initiation	NA	NA
h. _____	___	___

TABLE 3.3.3-2 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
4. AUTOMATIC DEPRESSURIZATION SYSTEM		
a. Reactor Water Level - Low Low Low, Level 1	≥ -129) inches*	≥ (-136) inches
b. Drywell Pressure - High	≤ (1.69) psig	≤ (1.89) psig
c. ADS Timer	≤ (105) seconds	≤ (117) seconds
d. Core Spray Pump Discharge Pressure - High	≥ (145) psig, (increasing)	≥ (135) psig, (increasing), Subsystem A ≥ (155) psig, (increasing), Subsystem B
e. RHR LPCI Mode Pump Discharge Pressure-High	≥ (146) psig, increasing	≥ (115) psig, (increasing) Subsystem A ≥ (135) psig, (increasing), Subsystem B
f. Reactor Vessel Water Level-Low, Level 3	≥ (13) inches	≥ (11.5) inches
g. Manual Initiation	NA	NA
h. _____	—	—
5. LOSS OF POWER		
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage (**))	a. 4.16 kv Basis - (2940)±(161) volts b. 120 v Basis - (84)±(4.6) volts c. ≤ (10) sec. time delay	(2940)±(315) volts (84)±(9) volts ≤ (10) sec. time delay
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	a. 4.16 kv Basis - (3727)±(9) volts b. 120 v Basis - (106.5)±(0.25) volts c. (10)±(0.5) sec. time delay	(3727)±(21) volts (106.5)±(0.60) volts (10)±(1.0) sec. time delay

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

(** This is an inverse time delay voltage relay. The voltages shown are the maximum that will not result in a trip. Some voltage conditions will result in decreased trip times.)

(# X is value that ensures adequate NPSH and precludes air entry due to vortexing.)

(## Y is (5) inches above normal water level.)

TABLE 3.3.3-3

EMERGENCY CORE COOLING SYSTEM RESPONSE TIMES

ECCS	RESPONSE TIME (Seconds)
1. CORE SPRAY SYSTEM	≤ (27)
2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM	≤ (40)
3. AUTOMATIC DEPRESSURIZATION SYSTEM	NA
4. HIGH PRESSURE COOLANT INJECTION SYSTEM	≤ (30)
5. LOSS OF POWER	NA

TABLE 4.3.3.1-1

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
1. CORE SPRAY SYSTEM				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	(S)	M → Q	(R)	1, 2, 3
c. Reactor Vessel Pressure - Low	(S)	M → Q	(R)	1, 2, 3, 4*, 5*
d. CSS Pump Discharge Flow - Low	(S)	M → Q	(R)	1, 2, 3, 4*, 5*
e. Manual Initiation	NA	(M[a]) (R) → Q	NA	1, 2, 3, 4*, 5*
f. _____	—	—	—	_____
2. LOW PRESSURE COOLANT INJECTION MODE OF RHR SYSTEM				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R	1, 2, 3, 4*, 5*
b. Drywell Pressure - High	(S)	M → Q	(R)	1, 2, 3
c. Reactor Vessel Pressure - Low	(S)	M → Q	(R)	1, 2, 3, 4*, 5*
d. LPCI Pump Discharge Flow - Low	(S)	M → Q	(R)	1, 2, 3, 4*, 5*
e. Manual Initiation	NA	(M[a]) (R) → Q	NA	1, 2, 3, 4*, 5*
f. _____	—	—	—	_____
3. HIGH PRESSURE COOLANT INJECTION SYSTEM				
a. Reactor Vessel Water Level - (Low Low, Level 2)	S	M → Q	R	1, 2, 3
b. Drywell Pressure - High	(S)	M → Q	(R)	1, 2, 3
c. Condensate Storage Tank Level - Low	(S)	M → Q	(R)	1, 2, 3
d. Suppression Pool Water Level - High	(S)	M → Q	(R)	1, 2, 3
e. Reactor Vessel Water Level - High, Level (8)	(S)	M → Q	(R)	1, 2, 3
f. HPCI Pump Discharge Flow - Low	(S)	M → Q	(R)	1, 2, 3
g. Manual Initiation	NA	(M[a]) (R) → Q	NA	1, 2, 3
h. _____	—	— → Q	—	_____

TABLE 4.3.3.1-1 (Continued)

EMERGENCY CORE COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS FOR WHICH SURVEILLANCE REQUIRED
4. AUTOMATIC DEPRESSURIZATION SYSTEM#				
a. Reactor Vessel Water Level - Low Low Low, Level 1	S	M → Q	R	1, 2, 3
b. Drywell Pressure - High	(S)	M → Q	(R)	1, 2, 3
c. ADS Timer	NA	M → Q	Q	1, 2, 3
d. Core Spray Pump Discharge Pressure - High	(S)	M → Q	(R)	1, 2, 3
e. RHR LPCI Mode Pump Discharge Pressure - High	(S)	M → Q	(R)	1, 2, 3
f. Reactor Vessel Water Level - Low, Level 3	S	M → Q	R	1, 2, 3
g. Manual Initiation	NA	M → (M[(a)]) (R) → Q	NA	1, 2, 3
h. _____	—	_____	—	_____
5. LOSS OF POWER				
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	NA	NA	R	1, 2, 3, 4**, 5**
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	S	M	R	1, 2, 3, 4**, 5**

((a) Manual initiation switches shall be tested at least once per 18 months during shutdown. All other circuitry associated with manual initiation shall receive a CHANNEL FUNCTIONAL TEST at least once per 31 day as part of circuitry required to be tested for automatic system actuation.)

* When the system is required to be OPERABLE per Specification 3.5.2.

** Required OPERABLE when ESF equipment is required to be OPERABLE.

Not required to be OPERABLE when reactor steam dome pressure is less than or equal to (100) psig.

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Enclosure 5

BWR 6 (Clinton) Solid-State RCIC Actuation Instrumentation Technical Specification

INSTRUMENTATION

3/4.3.5 REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.5 The reactor core isolation cooling (RCIC) system actuation instrumentation channels shown in Table 3.3.5-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.5-2.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3 with reactor steam dome pressure greater than 150 psig.

ACTION:

a. With an RCIC system actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Value column of Table 3.3.5-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With one or more RCIC system actuation instrumentation channels inoperable, take the ACTION required by Table 3.3.5-1.

SURVEILLANCE REQUIREMENTS

4.3.5.1 Each RCIC system actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.3.5.1-1.

4.3.5.2 LOGIC SYSTEM FUNCTIONAL TESTS shall be performed at least once per 18 months. All RCIC actuation system logic shall be manually tested independent of the SELF TEST SYSTEM such that all trip functions are tested at least once every four fuel cycles.*

*Manual testing for the purpose of satisfying Specification 4.3.5.2 is not required until after shutdown during the first regularly scheduled refueling outage.

TABLE 3.3.5-1

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

FUNCTIONAL UNITS	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM	ACTION
a. Reactor Vessel Water Level - Low Low, Level 2	2(b)(a)	50
b. Reactor Vessel Water Level - High, Level 8	2(c)	51
c. RCIC Storage Tank Water Level - Low	2(d)(a)	52
d. Suppression Pool Water Level - High	2(d)(a)	52
e. Manual Initiation	1(e)	53

TABLE 3.3.5-1 (Continued)

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

TABLE NOTATIONS

(a) A channel may be placed in an inoperable status for up to 6 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) Two trip systems with two channels per trip system.

(c) One trip system with two-out-of-two logic.

(d) One trip system with one-out-of-two logic.

(e) One trip system with one channel.

ACTION

ACTION 50 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement:

a. For 1 trip system, place the inoperable channel(s) and/or that trip system in the tripped condition within ~~one hour~~ 24 hours or declare the RCIC system inoperable.

b. For both trip systems, declare the RCIC system inoperable.

ACTION 51 - With the number of OPERABLE channels less than required by the Minimum OPERABLE channels per Trip System requirement, declare the RCIC system inoperable within 24 hours.

ACTION 52 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, place at least one inoperable channel in the tripped condition within ~~1 hour~~ 24 hours or declare the RCIC system inoperable.

ACTION 53 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, restore the inoperable channel to OPERABLE status within ~~8 hours~~ 24 hours or declare the RCIC system inoperable.

TAB . 3.5-2

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

FUNCTIONAL UNITS	TRIP SETPOINT	ALLOWABLE VALUE
a. Reactor Vessel Water Level - Low Low, Level 2	$\geq$ -45.5 in.*	$\geq$ -47.7 in.
b. Reactor Vessel Water Level - High, Level 8	$\leq$ 52.0 in.*	$\leq$ 52.6 in.
c. RCIC Storage Tank Level - Low	$\geq$ 3½ in.**	$\geq$ 0 in.**
d. Suppression Pool Water Level - High	$\leq$ 6½ in.†	$\leq$ 12 in.†
e. Manual Initiation	NA	NA

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

** Instrument zero is 739' 10-3/4" msl.

† Instrument zero is 731' 5" msl.

TABLE 4.3.5.1-1

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNITS	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION
a. Reactor Vessel Water Level - Low Low, Level 2	S	M → Q	R(a)
b. Reactor Vessel Water Level - High, Level 8	S	M → Q	R(a)
c. RCIC Storage Tank Level - Low	S	M → Q	R(a)
d. Suppression Pool Water Level - High	S	M → Q	R(a)
e. Manual Initiation	NA	R	NA

(a) Calibrate the analog trip module at least once per ~~31~~ 92 days.

Enclosure 6

BWR 6

RCIC Actuation Instrumentation

Technical Specification

3/4.3.5 REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.5 The reactor core isolation cooling (RCIC) system actuation instrumentation channels shown in Table 3.3.5-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.5-2.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2 and 3 with reactor steam dome pressure greater than (100) psig.

ACTION:

a. With a RCIC system actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.5-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With one or more RCIC system actuation instrumentation channels inoperable, take the ACTION required by Table 3.3.5-1.

SURVEILLANCE REQUIREMENTS

4.3.5.1 Each RCIC system actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.3.5.1-1.

4.3.5.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

TABLE 3.3.5-1

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

FUNCTIONAL UNITS	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM[a]	ACTION
a. Reactor Vessel Water Level - Low Low, Level 2	2	50
b. Reactor Vessel Water Level - High, Level 8	2[b]	51
c. Condensate Storage Tank Water Level - Low	(2)[c]	52
d. Suppression Pool Water Level - High	(2)[c]	52
e. Manual Initiation	(1)/(system)[d]	52 53

(a) A channel may be placed in an inoperable status for up to 6 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) One trip system with two-out-of-two logic.
(c) One trip system with one-out-of-two logic.
(d) One trip system with one channel.

TABLE 3.3.5-1 (continued)
REACTOR CORE ISOLATION COOLING SYSTEM
ACTUATION INSTRUMENTATION

ACTION 50 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement:

a. ~~For one trip system~~, with one channel inoperable, place the inoperable channel ~~and/or that trip system~~ in the tripped condition within ~~one hour~~ 24 hours or declare the RCIC system inoperable.

b. ~~For both trip systems~~, with more than one channel inoperable, declare the RCIC system inoperable.

ACTION 51 - With the number of OPERABLE channels less than required by the Minimum OPERABLE channels per Trip System requirement, declare the RCIC system inoperable within 24 hours.

ACTION 52 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, place at least one inoperable channel in the tripped condition within ~~one hour~~ 24 hours or declare the RCIC system inoperable.

ACTION 53 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, restore the inoperable channel to OPERABLE status within ~~(8) hours~~ 24 hours or declare the RCIC system inoperable.

TABLE 3.3.5-2

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

FUNCTIONAL UNITS	TRIP SETPOINT	ALLOWABLE VALUE
a. Reactor Vessel Water Level - (Low Low, Level 2)	≥ -(51) inches*	≥ -(53) inches
b. Reactor Vessel Water Level - High, Level 8	≤ (52) inches*	≤ (52.6) inches
c. Condensate Storage Tank Level - Low	≥ (14) inches	≥ (9) inches
d. Suppression Pool Water Level - High	≤ (5) inches	≤ (21) inches
e. Manual Initiation	NA	NA

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

TABLE 4.3.5.1-1

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNITS	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION
a. Reactor Vessel Water Level - Low Low, Level 2	S	M → Q	R(a)
b. Reactor Vessel Water Level - High, Level 8	S	M → Q	R
c. Condensate Storage Tank Level - Low	S	M → Q	M
d. Suppression Pool Water Level - High	S	M → Q	R
e. Manual Initiation	NA	M(b)	NA

(a) Calibrate trip unit at least once per 31 days. 92

(b) Manual initiation switches shall be tested at least once per 18 months during shutdown. All other circuitry associated with manual initiation shall receive a CHANNEL FUNCTIONAL TEST at least once per 31 days as a part of circuitry required to be tested for automatic system actuation. 92

Enclosure 7

BWR 5

RCIC Actuation Instrumentation

Technical Specification

3/4.3.5 REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.5 The reactor core isolation cooling (RCIC) system actuation instrumentation channels shown in Table 3.3.5-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.5-2.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2 and 3 with reactor steam dome pressure greater than (100) psig.

ACTION:

a. With a RCIC system actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.5-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With one or more RCIC system actuation instrumentation channels inoperable, take the ACTION required by Table 3.3.5-1.

SURVEILLANCE REQUIREMENTS

4.3.5.1 Each RCIC system actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.3.5.1-1.

4.3.5.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

TABLE 3.3.5-1

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

FUNCTIONAL UNITS	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM[a]	ACTION
a. Reactor Vessel Water Level - (Low Low, Level 2)	2	50
b. Reactor Vessel Water Level - High	2[b]	51
c. Condensate Storage Tank Water Level - Low	(2)[c]	52
d. Suppression Pool Water Level - High	(1)[d]	52
e. Manual Initiation	(1)/(system)[d]	53

(a) A channel may be placed in an inoperable status for up to 6 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) One trip system with two-out-of-two logic.
(c) One trip system with one-out-of-two logic.
(d) Single channel.

TABLE 3.3.5-1 (Continued)

REACTOR CORE ISOLATION COOLING SYSTEM

ACTUATION INSTRUMENTATION

ACTION 50 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement:

a. For one trip system, place the inoperable channel in the tripped condition within ~~one hour~~ or declare the RCIC system inoperable. 24 hours

b. For both trip systems, declare the RCIC system inoperable.

ACTION 51 - With the number of OPERABLE channels less than required by the minimum OPERABLE channels per Trip System requirement, declare the RCIC system inoperable within 24 hours

ACTION 52 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, place at least one inoperable channel in the tripped condition within ~~one hour~~ or declare the RCIC system inoperable. 24 hours

ACTION 53 - With the number of OPERABLE channels one less than required by the Minimum OPERABLE Channels per Trip System requirement, restore the inoperable channel to OPERABLE status within ~~(8) hours~~ or declare the RCIC system inoperable. 24 hours

TABLE 3.3.5-2

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

FUNCTIONAL UNITS	TRIP SETPOINT	ALLOWABLE VALUE
a. Reactor Vessel Water Level - (Low Low, Level 2)	$\geq$ - (38) inches*	$\geq$ -( ) inches*
b. Reactor Vessel Water Level - High	$\leq$ ( ) inches*	$\leq$ ( ) inches*
c. Condensate Storage Tank Level - Low	$\geq$ ( ) inches	$\geq$ ( ) inches
d. Suppression Pool Water Level - High	$\leq$ ( ) inches	$\leq$ ( ) inches
e. Manual Initiation	NA	NA

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

TABLE 4.3.5.1-1

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNITS	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION
a. Reactor Vessel Water Level - (Low Low, Level 2)	S	M → Q	R
b. Reactor Vessel Water Level - High	S	M → Q	R
c. Condensate Storage Tank Level - Low	(S)	M → Q	(R)
d. Suppression Pool Water Level - High	(S)	M → Q	(R)
e. Manual Initiation	NA	M[(a)] → Q	NA

(a) Manual initiation switches shall be tested at least once per 18 months during shutdown. All other circuitry associated with manual initiation shall receive a CHANNEL FUNCTIONAL TEST at least once per ~~31~~ 92 days as part of circuitry required to be tested for automatic system actuation.

Enclosure 8

BWR 4

RCIC Actuation Instrumentation

Technical Specification

3/4.3.5 REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.5 The reactor core isolation cooling (RCIC) system actuation instrumentation channels shown in Table 3.3.5-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.5-2.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2 and 3 with reactor steam dome pressure greater than (100) psig.

ACTION:

a. With a RCIC system actuation instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.5-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With one or more RCIC system actuation instrumentation channels inoperable, take the ACTION required by Table 3.3.5-1.

SURVEILLANCE REQUIREMENTS

4.3.5.1 Each RCIC system actuation instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.3.5.1-1.

4.3.5.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

TABLE 3.3.5-1

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION

FUNCTIONAL UNITS	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM[a]	ACTION
a. Reactor Vessel Water Level - (Low Low, Level 2)	2	50
b. Reactor Vessel Water Level - High, Level (8)	2[b]	51
c. Condensate Storage Tank Water Level - Low	(2)[c]	52
d. Suppression Pool Water Level - High	(2)[c]	52
e. Manual Initiation	(1)/(system)[d]	(53)

(a) A channel may be placed in an inoperable status for up to 6 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) One trip system with two-out-of-two logic.
(c) One trip system with one-out-of-two logic.
(d) One trip system with one channel.

TABLE 3.3.5-1 (Continued)

REACTOR CORE ISOLATION COOLING SYSTEM

ACTUATION INSTRUMENTATION

ACTION 50 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement:

a. For one trip system, place the inoperable channel(s) and/or that trip system in the tripped condition within ~~one hour~~ 24 hours or declare the RCIC system inoperable.

b. For both trip systems, declare the RCIC system inoperable.

ACTION 51 - With the number of OPERABLE channels less than required by the minimum OPERABLE channels per Trip System requirement, declare the RCIC system inoperable within 24 hours.

ACTION 52 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, place at least one inoperable channel in the tripped condition within ~~one hour~~ 24 hours or declare the RCIC system inoperable.

ACTION 53 - With the number of OPERABLE channels one less than required by the Minimum OPERABLE Channels per Trip System requirement, restore the inoperable channel to OPERABLE status within ~~(8) hours~~ 24 hours or declare the RCIC system inoperable.

TABLE 3.3.5-2

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION SETPOINTS

FUNCTIONAL UNITS	TRIP SETPOINT	ALLOWABLE VALUE
a. Reactor Vessel Water Level - (Low Low, Level 2)	$\geq$ - (33) inches*	$\geq$ -( ) inches
b. Reactor Vessel Water Level - High, Level (8)	$\leq$ (54) inches*	$\leq$ (55.5) inches
c. Condensate Storage Tank Level - Low	$\geq$ ( ) inches	$\geq$ ( ) inches
d. Suppression Pool Water Level - High	$\leq$ ( ) inches	$\leq$ ( ) inches
e. Manual Initiation	NA	NA

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

TABLE 4.3.5.1-1

REACTOR CORE ISOLATION COOLING SYSTEM ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNITS	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION
a. Reactor Vessel Water Level - (Low Low, Level 2)	S	M → Q	R
b. Reactor Vessel Water Level - High, Level (8)	S	M → Q	R
c. Condensate Storage Tank Level - Low	(S)	M → Q	(R)
d. Suppression Pool Water Level - High	(S)	M → Q	(R)
e. Manual Initiation	NA	(M[(a)]) (R)	NA

((a) Manual initiation switches shall be tested at least once per 18 months during shutdown. All other circuitry associated with manual initiation shall receive a CHANNEL FUNCTIONAL TEST at least once per ~~31~~ 92 days as part of circuitry required to be tested for automatic system actuation.)