3.3 INSTRUMENTATION

3.3.6.1 Primary Containment Isolation Instrumentation

[3.2.A] LCO 3.3.6.1 The primary containment isolation instrumentation for each Function in Table 3.3.6.1-1 shall be OPERABLE.

[Table 3.2-1] [3.2.A] APPLICABILITY: According to Table 3.3.6.1-1.

[L18] ACTIONS

1. Penetration flow paths may be unisolated intermittently under administrative controls. (TA1)

-----NOTE----- (S) (TA1)

[A3] 2. Separate Condition entry is allowed for each channel. (TA1)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1 Place channel in trip.	12 hours for Functions 2.a, 2.b, ~~and~~ 6.b, (7.a, and 7.b) (2.d, 2.e, 5.e, 5.f) (DB1) AND 24 hours for Functions other than Functions 2.a, 2.b, and 6.b (7.a, and 7.b)
B. One or more ~~automatic~~ (L07) Functions with isolation capability not maintained.	B.1 Restore isolation capability.	1 hour

[L19] [Table 3.2-1 Note 1.a, 1.b.3] (beside Condition A); [Table 3.2-1 Note 1.b.1] [M5] (beside Condition B); (J) (beside Completion Time A)

(continued)

Type all Pages

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. As required by Required Action C.1 and referenced in Table 3.3.6.1-1. OR Required Action and associated Completion Time for Condition F or G not met.	H.1 Be in MODE 3. AND H.2 Be in MODE 4.	12 hours 36 hours
I. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	I.1 Declare associated standby liquid control subsystem (SLC) inoperable. OR I.2 Isolate the Reactor Water Cleanup System.	1 hour 1 hour
J. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	J.1 Initiate action to restore channel to OPERABLE status. OR J.2 Initiate action to isolate the Residual Heat Removal (RHR) Shutdown Cooling System.	Immediately Immediately

T.3.2-1 Note 3.A M7, L11

PA5

PA4 of

[M11]

[L5]
[M2]

J

REVISION J

for Functions 2.d, 2.g, 7.a, and 7.b; and (b) for up to 6 hours for Functions other than 2.d, 2.g, 7.a, and 7.b

SURVEILLANCE REQUIREMENTS

-----NOTES-----

[4.1.A] 1. Refer to Table 3.3.6.1-1 to determine which SRs apply for each Primary Containment Isolation Function.

as follows: (a) — CLB1

[T 3.2-1 Note 2, M11, M10] 2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains isolation capability.

SURVEILLANCE	FREQUENCY
SR 3.3.6.1.1 Perform CHANNEL CHECK.	12 hours
SR 3.3.6.1.2 Perform CHANNEL FUNCTIONAL TEST. (PA4)	~~[92]~~ days
SR 3.3.6.1.~~3~~ (4) Calibrate the trip unit. (5)	(184 days) ~~[92]~~ days
SR 3.3.6.1.~~4~~ (3) (CLB3) Perform CHANNEL CALIBRATION.	92 days
~~SR 3.3.6.1.5 Perform CHANNEL FUNCTIONAL TEST.~~	~~[184] days~~
SR 3.3.6.1.~~6~~ (5) (CLB3) (CLB4) Perform CHANNEL CALIBRATION.	~~[18]~~ (24) months
SR 3.3.6.1.7 Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~[18]~~ (24) months
SR 3.3.6.1.6 Calibrate the radiation detectors.	24 months

(continued)

CLB2, CLB3, CLB4, CLB10, DB2, Insert SR 3.3.6.1.3 Note

[T.4.1-1] [M9] [T.4.2-1] [M9] [T.4.2-1] [T.4.1-1] [T.4.2-1 Note 15] [T.4.1-2 Note 6] [T.4.2-1] [T.4.2-1 Note 11 for (3)] [T.4.1-2 Note 6] [T.4.2-1 Note 15] [T.4.2-B] [T 4.2-1] [M1] [T.4.2-1 Note 11]

DB6 INSERT Functions 2.d, 2.e, 2.f, 2.g

[T3.2-1(6)] [T4.1-1(8)] [T3.2-1 Note 8]	d.	Drywell Pressure - High	1,2,3	2(c)	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.5 SR 3.3.6.1.7	≤ 2.7 psig	
[T3.2-1(4)] [T4.2-1(2)]	e.	Reactor Vessel Water Level - Low Low Low (Level 1)	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.5 SR 3.3.6.1.7	≥ 18 inches	1 J
[T3.2-1(7)] [T4.2-1(8)]	f.	Main Steam Line Radiation - High	1(b), 2(b)	2	F	SR 3.3.6.1.1 SR 3.3.6.1.3 SR 3.3.6.1.6 SR 3.3.6.1.7	≤ 3 times Normal Full Power Background	1 J
[T3.2-1 Note 8] [T3.2-1(2)] [T4.1-1(4)]	g.	Reactor Vessel Water Level - Low (Level 3)	1,2,3	2(c)	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.5 SR 3.3.6.1.7	≥ 177 inches	

Table 3.3.6.1-1 (page 5 of 6)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. RCIC System Isolation (continued)					
i. RCIC Equipment Room Temperature — High	1,2,3	[1]	F	[SR 3.3.6.1.1] SR 3.3.6.1.2 [SR 3.3.6.1.3] SR 3.3.6.1.6 SR 3.3.6.1.7	≤ [ ]°F
j. RCIC Equipment Room Differential Temperature — High	1,2,3	[1]	F	[SR 3.3.6.1.1] SR 3.3.6.1.2 [SR 3.3.6.1.3] SR 3.3.6.1.4 SR 3.3.6.1.7	≤ [ ]°F
k. Manual Initiation	1,2,3	[1 per group]	G	SR 3.3.6.1.7	NA
5. Reactor Water Cleanup (RWCU) System Isolation					
a. Differential Flow — High	1,2,3	[1]	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.6 SR 3.3.6.1.7 SR 3.3.6.1.8	≤ [79] gpm
b. Area Temperature — High	1,2,3	[1 per room]	F	SR 3.3.6.1.1 SR 3.3.6.1.2 [SR 3.3.6.1.3] SR 3.3.6.1.6 SR 3.3.6.1.7 [SR 3.3.6.1.8]	≤ [150]°F
c. Area Ventilation Differential Temperature — High	1,2,3	[1 per room]	F	SR 3.3.6.1.1 SR 3.3.6.1.2 [SR 3.3.6.1.3] SR 3.3.6.1.6 SR 3.3.6.1.7 [SR 3.3.6.1.8]	≤ [67]°F
d. SLC System Initiation	1,2	[2](b)	I	SR 3.3.6.1.7	NA
e. Reactor Vessel Water Level — Low Level 2	1,2,3	[2]	F	SR 3.3.6.1.1 SR 3.3.6.1.2 [SR 3.3.6.1.3] SR 3.3.6.1.6 SR 3.3.6.1.7 SR 3.3.6.1.8	≥ [-47] inches
f. Manual Initiation	1,2,3	[1 per group]	G	SR 3.3.6.1.7	NA

(continued)

(b) SLC System Initiation only inputs into one of the two trip systems.

DB7; [T 3.2-1 (20)] [M14]; Area; DB4; PA3; 144; ≤ 60°F; DB3; add SR 3.3.6.1.5; (2); (f); DB10; DB7; CLB7; DB7; J; PA2; RWCU Pump; Insert Function 5.a DB6; 165; for Pump Room A and ≤ 175°F for Pump Room B; add SR 3.3.6.1.3; DB5; [T 3.2-1 (11)] [M14]; Insert Function 5.c DB6; [T 3.2-1 (11)]; DB7; DB8; DB6; (d); DB9; (3); 177; [M11]; PA2; [T 3.2-1 (1)] [T 4.1-1 (9)] [T 4.1-2 (7)]; PA1; DB6; (4); (5); CLB5; Insert Function 5.f; CLB7; (d) DB6; "and only isolates one valve in the RWCU suction and return line" DB9; J

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Table 3.3.6.1-1 (page 6 of 6)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
6. Shutdown Cooling System Isolation					
a. Reactor Steam Dome Pressure - High	1,2,3	[1]	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.6 SR 3.3.6.1.7	≤ [145] psig
b. Reactor Vessel Water Level - Low, Level 3	3,4,5	[2](a)	J	SR 3.3.6.1.1 SR 3.3.6.1.2 [SR 3.3.6.1.5] SR 3.3.6.1.6 SR 3.3.6.1.7	≥ [10] inches
7. Traversing Incore Probe System Isolation					
a. Reactor Vessel Water Level - Low, Level 3	1,2,3	[2]	G	SR 3.3.6.1.1 SR 3.3.6.1.2 [SR 3.3.6.1.4] SR 3.3.6.1.5 SR 3.3.6.1.7	≥ [10] inches
b. Drywell Pressure - High	1,2,3	[2]	G	SR 3.3.6.1.1 SR 3.3.6.1.2 [SR 3.3.6.1.4] SR 3.3.6.1.5 SR 3.3.6.1.7	≤ [1.1] psig

(a) (e) Only one trip system required in MODES 4 and 5 when RHR Shutdown Cooling System integrity maintained.

[M14] [T. 3.2-1(3)] [T 4.2-1(1)] [1.2.2/2.2.2]

[T 3.2-1(1)] [M2] [T. 4.1-1(9)] [T 4.1-2(7)]

[M2]

[T 3.2-1(2)(6)] [L19] T 4.1-1 (8)(9)

DB4 DB5 PA3 74 DB10 PA2 177 e J DB6 TA1 DB4 DB10 177 DB10 2.7 4 5

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PLANT-SPECIFIC WORDING PREFERENCE OR MINOR EDITORIAL IMPROVEMENT (PA)

PA4 An editorial change has been made to correct a typographical error.

PA5 Editorial change made to be consistent with other similar requirements in the ITS.

PLANT-SPECIFIC DIFFERENCE IN THE DESIGN (DB)

DB1 Four new Functions have been added to the Completion Times of ITS 3.3.6.1 Required Action A.1 since they are common to RPS.

DB2 The brackets have been removed from the Surveillance Frequency in ITS SR 3.3.6.1.5 (CHANNEL CALIBRATION) and extended from 18 months to 24 months consistent with the frequencies in CTS Table 4.2-1. The Frequency is consistent with the setpoint calculation methodology for the associated Functions. In addition, SR 3.3.6.1.6 has been added to calibrate the radiation detector of Functions 1.f and 2.f (Main Steam Line Radiation—High) consistent with the current allowances in CTS Table 4.2-1. The remaining portions of the channels will be calibrated in accordance with SR 3.3.6.1.3 as indicated by the associated Note. These allowances are also consistent with the setpoint calculation methodology for these functions.

DB3 The brackets have been removed from ITS Table 3.3.6.1-1 Function 4.f, RCIC Equipment Area Temperature—High and the Function has been retained consistent with the JAFNPP design and licensing basis.

DB4 The brackets have been removed and the proper number of channels included for each Function in Table 3.3.6.1-1. The values are consistent with the current requirements in CTS Table 3.1-1 except for Functions 3.b, 3.c, 4.b, and 4.c. The number of channels for these Functions have been changed consistent with the plant design and justified in M6.

DB5 The channels of ITS 3.3.6.1 Functions 1.b and 1.d include trip units, therefore, SR 3.3.6.1.4 and SR 3.3.6.1.5 have been added for these Functions. The channels of ITS 3.3.6.1 Functions 5.b and 6.a include a switch (temperature or pressure). These switches are calibrated every 3 months in accordance with the current setpoint methodology, therefore, the Surveillances associated with these Functions have been revised, as required.

DB6 The following ITS 3.3.6.1 Functions have been added since they are required by design and current licensing basis: Main Steam Line Radiation—High (1.f and 2.f); Function 2.e, Reactor Vessel Water Level—Low Low Low (Level 1); Functions 3.f, 3.g, 3.h, 3.i, 3.j (Area Temperatures associated with HPCI Isolation); Function 4.d, RCIC Steam

B 3.3 INSTRUMENTATION

B 3.3.6.1 Primary Containment Isolation Instrumentation

BASES

BACKGROUND

The primary containment isolation instrumentation automatically initiates closure of appropriate primary containment isolation valves (PCIVs). The function of the PCIVs, in combination with other accident mitigation systems, is to limit fission product release during and following postulated Design Basis Accidents (DBAs). Primary containment isolation within the time limits specified for those isolation valves designed to close automatically ensures that the release of radioactive material to the environment will be consistent with the assumptions used in (PA 1) the analyses for a DBA.

The isolation instrumentation includes the sensors, (logic circuits,) relays, and switches that are necessary to cause initiation of primary containment and reactor coolant pressure boundary (RCPB) isolation. Most channels include electronic equipment (e.g., trip units) that compares measured input signals with pre-established setpoints. When the setpoint is exceeded, the channel output relay actuates, which then outputs a primary containment isolation signal to the isolation logic. Functional diversity is provided by monitoring a wide range of independent parameters. The input parameters to the isolation logics are (a) reactor vessel water level, (b) area ambient and differential temperatures, (c) main steam line (MSL) flow measurement, (d) Standby Liquid Control (SLC) System initiation, (e) condenser vacuum, (f) main steam line pressure, (g) high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) steam line flow, (h) drywell radiation and pressure, (i) HPCI and RCIC steam line pressure, (j) HPCI and RCIC turbine exhaust diaphragm pressure, (k) reactor water cleanup (RWCU) differential flow, and (l) reactor steam dome pressure. Redundant sensor input signals from each parameter are provided for initiation of isolation. The only exception is SLC System initiation. In addition, manual isolation of the logics is provided.

Insert BKGD-1 (DB1) (CLB1) 1/J

Primary containment isolation instrumentation has inputs to the trip logic of the isolation functions listed below.

(continued)

BASES

BACKGROUND

3, 4. High Pressure Coolant Injection System Isolation and Reactor Core Isolation Cooling System Isolation (continued)

DB1 HPCI and RCIC Functions isolate the Group 3, 4, 8, and 9 valves.

DB1 unless otherwise noted

5. Reactor Water Cleanup System Isolation (PA2) (3) and Drywell Pressure—High

The Reactor Vessel Water Level—Low (Low) Level 2 Isolation Function receives input from four reactor vessel water level channels. The outputs from the reactor vessel water level channels are connected into two two-out-of-two trip systems. The Differential Flow—High and SLC System Initiation Functions receive input from two channels, with each channel in one trip system using a one-out-of-one logic. The Area Temperature—High Function receives input from six temperature monitors, three to each trip system. The Area Ventilation Differential Temperature—High Function receives input from six differential temperature monitors, three in each trip system. These are configured so that any one input will trip the associated trip system. Each of the two trip systems is connected to one of the two valves on each RWCU penetration.

RWCU Functions isolate the Group 5 valves.

PA1 5 (Functions 5.e and 5.f); (Function 5.d); both; providing input to; eight; four; PA1 5 (Functions 5.a, 5.b and 5.c); for each Function; the; suction; Insert Function 5-2; Insert Function 5-1; PA1

DB1 unless otherwise noted

6. Shutdown Cooling System Isolation (PA2)

The Reactor Vessel Water Level—Low, Level 3 Function receives input from four reactor vessel water level channels. The outputs from the reactor vessel water level channels are connected to two two-out-of-two trip systems. The Reactor Vessel Pressure—High Function receives input from two channels, with each channel in one trip system using a one-out-of-one logic. Each of the two trip systems is connected to one of the two valves on each shutdown cooling penetration.

Shutdown Cooling System Isolation Functions isolate the Group 11 valves.

(Function 6.b); (Function 6.a); However, only one channel input is required to be OPERABLE for a trip system to be considered OPERABLE. PA2; providing input into each; pump suction; two; the

Each of the two trip systems is connected to one of the two RHR shutdown cooling pump suction penetration valves on the RHR shutdown cooling pump suction and on one of the two inboard LPCI injection valves if in shutdown cooling mode.

(continued)

7. Traversing Incore Probe System Isolation (TA3)

INSERT FUNCTION 7-1

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DB3

INSERT ASA-2

In addition, the setting is low enough o allow the removal of heat from the reactor for a predetermined time following a scram, prevent isolation on a partial loss of feedwater and to reduce challenges tot he safety/relief valves (S/RVs). The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13). J

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.b. Main Steam Line Pressure—Low (continued)

The Main Steam Line Pressure—Low Function is only required to be OPERABLE in MODE 1 since this is when the assumed transient can occur (Ref. 2). The Function is automatically bypassed when the reactor mode switch is not in the run position. DB1

This Function isolates the ~~Group 1~~ MSIVs and MSL drain valves. PA2 DB1

1.c. Main Steam Line Flow—High

Main Steam Line Flow—High is provided to detect a break of the MSL and to initiate closure of the MSIVs. If the steam were allowed to continue flowing out of the break, the reactor would depressurize and the core could uncover. If the RPV water level decreases too far, fuel damage could occur. Therefore, the isolation is initiated on high flow to prevent or minimize core damage. The Main Steam Line Flow—High Function is directly assumed ~~in the analysis of the main steam line break (MSLB) (Ref. 4)~~. The isolation (3) DB1 action, along with the scram function of the Reactor Protection System (RPS), ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46 and offsite doses do not exceed the 10 CFR 100 limits.

The MSL flow signals are initiated from 16 transmitters that are connected to the four MSLs. The transmitters are arranged such that, even though physically separated from each other, all four connected to one MSL would be able to detect the high flow. Four channels of Main Steam Line Flow—High Function for each unisolated MSL (two channels per trip system) are available and are required to be OPERABLE so that no single instrument failure will preclude detecting a break in any individual MSL.

The Allowable Value is chosen to ensure that offsite dose limits are not exceeded due to the break. INSERT ASA-3 DB3

This Function isolates the ~~Group 1~~ MSIVs and MSL drain valves. PA2 DB3

1.d. Condenser Vacuum—Low

The Condenser Vacuum—Low Function is provided to prevent overpressurization of the main condenser in the event of a loss of the main condenser vacuum. Since the integrity of the condenser is an assumption in offsite dose calculations, the Condenser Vacuum—Low Function is assumed to be OPERABLE

(continued)

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.d. Condenser Vacuum—Low (continued)

and capable of initiating closure of the MSIVs. The closure of the MSIVs is initiated to prevent the addition of steam that would lead to additional condenser pressurization and possible rupture of the diaphragm installed to protect the turbine exhaust hood, thereby preventing a potential radiation leakage path following an accident.

Condenser vacuum pressure signals are derived from four pressure transmitters that sense the pressure in the condenser. Four channels of Condenser Vacuum—Low Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value is chosen to prevent damage to the condenser due to pressurization, thereby ensuring its integrity for offsite dose analysis. As noted (footnote (a) to Table 3.3.6.1-1), the channels are not required to be OPERABLE in MODES 2 and 3 when all turbine stop valves (TSVs) are closed, since the potential for condenser overpressurization is minimized. Switches are provided to manually bypass the channels when all TSVs are closed.

This Function isolates the Group 1 valves.

1.e., 1.f., 1.g. Area and Differential Temperature—High

Area and differential temperature is provided to detect a leak in the RCPB and provides diversity to the high flow instrumentation. The isolation occurs when a very small leak has occurred. If the small leak is allowed to continue without isolation, offsite dose limits may be reached. However, credit for these instruments is not taken in any transient or accident analysis in the FSAR, since bounding analyses are performed for large breaks, such as MSLBs.

Area temperature signals are initiated from thermocouples located in the area being monitored. Sixteen channels of Main Steam Tunnel Temperature—High Function and 64 channels of Turbine Building Area Temperature—High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function. Each Function has one temperature element.

(continued)

(ΔA4) INSERT Function 1.f

1.f. Main Steam Line Radiation–High

The Main Steam Line Radiation–High isolation signal has been removed from the MSIV isolation logic circuitry (Ref. 1); however, this isolation Function has been retained for the MSL drains valves (and other valves discussed under Function 2.f) to ensure that the assumptions utilized to determine that acceptable offsite doses resulting from a control rod drop accident (CRDA) are maintained.

Main Steam Line Radiation–High signals are generated from four radiation elements and associated monitors, which are located near the main steam lines in the steam tunnel. Four instrumentation channels of the Main Steam Line Radiation–High Function are available and required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value was selected to be low enough that a high radiation trip results from the fission products released in the CRDA. In addition, the setting is adjusted high enough above the background radiation level in the vicinity of the main steam lines so that spurious trips are avoided at rated power. As noted (footnote (b) to Table 3.3.6.1-1), the channels are only required to be OPERABLE in MODES 1 and 2 with THERMAL POWER ≤ 10% RTP. When THERMAL POWER is > 10% RTP, there is no possible control rod configuration that results in a control rod worth that could exceed the fuel damage limit during a CRDA (Refer to the Bases for Function 2 (Rod Worth Minimizer) of LCO 3.3.2.1, "Control Rod Block Instrumentation"). In MODES 3 and 4, all control rods are required to be inserted into the core; therefore, a CRDA cannot occur. In MODE 5, since only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will be subcritical.

This Function isolates the MSL drain valves.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Primary Containment Isolation

2.a. Reactor Vessel Water Level—Low, Level 3

Low RPV water level indicates that the capability to cool the fuel may be threatened. The valves whose penetrations communicate with the primary containment are isolated to limit the release of fission products. The isolation of the primary containment on Level 3 supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded. The Reactor Vessel Water Level—Low, Level 3 Function associated with isolation is implicitly assumed in the FSAR analysis as these leakage paths are assumed to be isolated post LOCA.

Reactor Vessel Water Level—Low, Level 3 signals are initiated from level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels of Reactor Vessel Water Level—Low, Level 3 Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Reactor Vessel Water Level—Low, Level 3 Allowable Value was chosen to be the same as the RPS Level 3 scram Allowable Value (LCO 3.3.1.1), since isolation of these valves is not critical to orderly plant shutdown.

This Function isolates the Group 2, 6, 10, and 12 valves.

2.b. Drywell Pressure—High

High drywell pressure can indicate a break in the RCPB inside the primary containment. The isolation of some of the primary containment isolation valves on high drywell pressure supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded. The Drywell Pressure—High Function, associated with isolation of the primary containment, is implicitly assumed in the FSAR accident analysis as these leakage paths are assumed to be isolated post LOCA.

High drywell pressure signals are initiated from pressure transmitters that sense the pressure in the drywell. Four

(continued)

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DB4 INSERT Function 2.g

For Function 2.g, two channels of Reactor Vessel Water Level - Low (Level 3) are required to be OPERABLE for each hydrogen/oxygen and gaseous/particulate sample supply and return penetration to ensure these penetrations can be isolated.

DB3 Insert Function 2.a (2)

The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13). 5

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.b. Drywell Pressure—High (continued)

channels of Drywell Pressure—High per Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value was selected to be the same as the ECCS Drywell Pressure—High Allowable Value (LCO 3.3.5.1), since this may be indicative of a LOCA inside primary containment.

This Function isolates the Group 2, 6, 7, 10, and 12 valves.

2.c. Drywell Radiation—High

High drywell radiation indicates possible gross failure of the fuel cladding. Therefore, when Drywell Radiation—High is detected, an isolation is initiated to limit the release of fission products. However, this Function is not assumed in any accident or transient analysis in the FSAR because other leakage paths (e.g., MSIVs) are more limiting.

The drywell radiation signals are initiated from radiation detectors that are located in the drywell. Two channels of Drywell Radiation—High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value is low enough to promptly detect gross failures in the fuel cladding.

This Function isolates the containment vent and purge valves.

2.d., 2.e. Reactor Building and Refueling Floor Exhaust Radiation—High

High secondary containment exhaust radiation is an indication of possible gross failure of the fuel cladding. The release may have originated from the primary containment due to a break in the RCPB. When Exhaust Radiation—High is detected, valves whose penetrations communicate with the primary containment atmosphere are isolated to limit the release of fission products. Additionally, the Refueling Floor Exhaust Radiation—High Function is assumed to

(continued)

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(DB4) INSERT Functions 2.e and 2.f

2.e. Reactor Vessel Water Level - Low Low Low (Level 1)

Low reactor pressure vessel (RPV) water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, isolation of the recirculation loop sample valves occurs to prevent offsite dose limits from being exceeded. The Reactor Vessel Water Level - Low Low Low (Level 1) Function is one of the many Functions assumed to be OPERABLE and capable of providing isolation signals. The Reactor Vessel Water Level - Low Low Low (Level 1) Function associated with isolation is assumed in the analysis of the recirculation line break (Ref. 3). The isolation of the recirculation loop sample valves on Level 1 supports actions to ensure that offsite dose limits are not exceeded for a DBA. 5

Reactor vessel water level signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels of Reactor Vessel Water Level - Low Low Low (Level 1) Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Reactor Vessel Water Level - Low Low Low (Level 1) Allowable Value is chosen to ensure that the recirculation loop sample valves close on a potential loss of coolant accident (LOCA) to prevent offsite doses from exceeding 10 CFR 100 limits. The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13). 5

This Function isolates the recirculation loop sample valves.

DB43 INSERT Functions 2.e and 2.f (continued)

2.f. Main Steam Line Radiation - High

The Main Steam Line Radiation - High isolation signal has been removed from the MSIV isolation logic circuitry (Ref. 1); however, this isolation Function has been retained for the recirculation loop sample valves to ensure that the assumptions utilized to determine that acceptable offsite doses resulting from a CRDA are maintained.

Main Steam Line Radiation - High signals are generated from four radiation elements and associated monitors, which are located near the main steam lines in the steam tunnel. Four instrumentation channels of the Main Steam Line Radiation - High Function are available and required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value was selected to be low enough that a high radiation trip results from the fission products released in the Design Basis CRDA. In addition, the setting is adjusted high enough above the background radiation level in the vicinity of the main steam lines so that spurious trips are avoided at rated power. As noted (footnote (b) to Table 3.3.6.1-1), the channels are only required to be OPERABLE in MODES 1 and 2 with THERMAL POWER ≤ 10% RTP. When THERMAL POWER is > 10% RTP, there is no possible control rod configuration that results in a control rod worth that could exceed the fuel damage limit during a CRDA (Refer to the Bases for Function 2 (Rod Worth Minimizer) of LCO 3.3.2.1). In MODES 3 and 4, all control rods are required to be inserted into the core; therefore, a CRDA cannot occur. In MODE 5, since only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will be subcritical. 15

This Function isolates the recirculation loop sample valves.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

High Pressure Coolant Injection and Reactor Core Isolation Cooling Systems Isolation

3.a, 4.a. HPCI and RCIC Steam Line Flow—High

Steam Line Flow—High Functions are provided to detect a break of the RCIC or HPCI steam lines and initiate closure of the steam line isolation valves of the appropriate system. If the steam is allowed to continue flowing out of the break, the reactor will depressurize and the core can uncover. Therefore, the isolations are initiated on high flow to prevent or minimize core damage. The isolation action, along with the scram function of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46. Specific credit for these Functions is not assumed in any FSAR accident analyses since the bounding analysis is performed for large breaks such as recirculation and MSL breaks. However, these instruments prevent the RCIC or HPCI steam line breaks from becoming bounding.

The HPCI and RCIC Steam Line Flow—High signals are initiated from transmitters (two for HPCI and two for RCIC) that are connected to the system steam lines. Two channels of both HPCI and RCIC Steam Line Flow—High Functions are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Values are chosen to be low enough to ensure that the trip occurs to prevent fuel damage and maintains the MSLB event as the bounding event.

These Functions isolate the Group 3 and 4 valves, as appropriate.

3.b, 4.b. HPCI and RCIC Steam Supply Line Pressure—Low

Low MSL pressure indicates that the pressure of the steam in the HPCI or RCIC turbine may be too low to continue operation of the associated system's turbine. These isolations are for equipment protection and are not assumed in any transient or accident analysis in the FSAR. However, they also provide a diverse signal to indicate a possible system break. These instruments are included in Technical Specifications (TS) because of the potential for risk due to

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.b, 4.b. HPCI and RCIC Steam Supply Line Pressure—Low (continued)

possible failure of the instruments preventing HPCI and RCIC initiations (Ref. 3).

The HPCI and RCIC Steam Supply Line Pressure—Low signals are initiated from transmitters (four for HPCI and four for RCIC) that are connected to the system steam line. Four channels of both HPCI and RCIC Steam Supply Line Pressure—Low Functions are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Values are selected to be high enough to prevent damage to the system's turbine.

These Functions isolate the Group 3 and 4 valves, as appropriate.

3.c, 4.c. HPCI and RCIC Turbine Exhaust Diaphragm Pressure—High

High turbine exhaust diaphragm pressure indicates that the pressure may be too high to continue operation of the associated system's turbine. That is, one of two exhaust diaphragms has ruptured and pressure is reaching turbine casing pressure limits. These isolations are for equipment protection and are not assumed in any transient or accident analysis in the FSAR. These instruments are included in the TS because of the potential for risk due to possible failure of the instruments preventing HPCI and RCIC initiations (Ref. 3).

The HPCI and RCIC Turbine Exhaust Diaphragm Pressure—High signals are initiated from transmitters (four for HPCI and four for RCIC) that are connected to the area between the rupture diaphragms on each system's turbine exhaust line. Four channels of both HPCI and RCIC Turbine Exhaust Diaphragm Pressure—High Functions are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Values are high enough to prevent damage to the system's turbine.

(continued)

Revision J

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.c., 4.c. HPCI and RCIC Turbine Exhaust Diaphragm Pressure—High (continued)

These Functions isolate the Group 3 and 4 valves, as appropriate, as listed in Reference 1.

3.d., 4.d. Drywell Pressure—High

High drywell pressure can indicate a break in the RCPB. The HPCI and RCIC isolation of the turbine exhaust is provided to prevent communication with the drywell when high drywell pressure exists. A potential leakage path exists via the turbine exhaust. The isolation is delayed until the system becomes unavailable for injection (i.e., low steam line pressure). The isolation of the HPCI and RCIC turbine exhaust by Drywell Pressure—High is indirectly assumed in the FSAR accident analysis because the turbine exhaust leakage path is not assumed to contribute to offsite doses.

High drywell pressure signals are initiated from pressure transmitters that sense the pressure in the drywell. Two channels of both HPCI and RCIC Drywell Pressure—High Functions are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value was selected to be the same as the ECCS Drywell Pressure—High Allowable Value (LCO 3.3.5.1), since this is indicative of a LOCA inside primary containment.

This Function isolates the Group 8 and 9 valves.

3.e., 3.f., 3.h., 3.i., 4.e., 4.f., 4.h., 4.i., 4.j. Area and Differential Temperature—High

HPCI and RCIC Area and differential temperatures are provided to detect a leak from the associated system steam piping. The isolation occurs when a very small leak has occurred and is diverse to the high flow instrumentation. If the small leak is allowed to continue without isolation, offsite dose limits may be reached. These Functions are not assumed in any FSAR transient or accident analysis, since bounding analyses are performed for large breaks such as recirculation or MSL breaks.

(continued)

Revision J

DB4 DB5

BASES

3.d, 3.g, 3.j, 4.d, f, HPCI and RCIC, PA1

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

PA1 3.e. 3.f. 3.h. 3.i. 4.e. 4.g. 4.h. 4.i. 4.j. Area and Differential Temperature—High (continued) J

Area and Differential Temperature—High signals are initiated from thermocouples (resistance temperature detectors (RTDs) DB1) that are appropriately located to protect the system that is being monitored. Two instruments monitor each area. Two (All DB1) channels for each HPCI and RCIC Area and Differential Temperature—High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

for a total of 16 channels for HPCI and 8 channels for RCIC DB1

Eight thermocouples provide input to the Area Ventilation Differential Temperature—High Function. The output of these thermocouples is used to determine the differential temperature. Each channel consists of a differential temperature instrument that receives inputs from thermocouples that are located in the inlet and outlet of the area cooling system for a total of four available channels (two for RCIC and two for HPCI). DB5

The Allowable Values are set (high enough above normal operating levels to avoid spurious operation but DB3) low enough to detect a leak equivalent to 25 gpm. (provide timely detection of a steam leak DB3)

These Functions isolate the Group 3 and 4 valves, as appropriate (PA2), as listed in Reference 1 DB1.

DB5

3.g., 4.f. Suppression Pool Area Temperature—Time Delay Relay

The Suppression Pool Area Temperature—Time Delay Relays are provided to allow all the other systems that may be leaking into the pool area (as indicated by the high temperature) to be isolated before HPCI and/or RCIC are automatically isolated. This ensures maximum HPCI and RCIC System operation by preventing isolations due to leaks in other systems. These Functions are not assumed in any FSAR transient or accident analysis.

There are four time delay relays (two for HPCI and two for RCIC). Two channels each for both HPCI and RCIC Suppression Pool Area Temperature—Time Delay Relay Functions are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

(continued)

Revision J

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

5.a. Differential Flow—High (continued)

RWCU System is initiated when high differential flow is sensed to prevent exceeding offsite doses. A time delay is provided to prevent spurious trips during most RWCU operational transients. This Function is not assumed in any FSAR transient or accident analysis, since bounding analyses are performed for large breaks such as MSLBs.

The high differential flow signals are initiated from transmitters that are connected to the inlet (from the reactor vessel) and outlets (to condenser and feedwater) of the RWCU System. The outputs of the transmitters are compared (in a common summer) and the resulting output is sent to two high flow trip units. If the difference between the inlet and outlet flow is too large, each trip unit generates an isolation signal. Two channels of Differential Flow—High Function are available and are required to be OPERABLE to ensure that no single instrument failure downstream of the common summer can preclude the isolation function.

The Differential Flow—High Allowable Value ensures that a break of the RWCU piping is detected.

This Function isolates the Group 5 valves.

5.b., 5.c. Area and Area Ventilation Differential Temperature—High

RWCU area and area ventilation differential temperatures are provided to detect a leak from the RWCU System. The isolation occurs even when very small leaks have occurred and is diverse to the high differential flow instrumentation for the hot portions of the RWCU System. If the small leak continues without isolation, offsite dose limits may be reached. Credit for these instruments is not taken in any transient or accident analysis in the FSAR, since bounding analyses are performed for large breaks such as recirculation or MSL breaks.

Area and area ventilation differential temperature signals are initiated from temperature elements that are located in the room that is being monitored. Six thermocouples provide input to the Area Temperature—High Function (two per area). Six channels are required to be OPERABLE to ensure that no

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

5.b, 5.c, Area and Area Ventilation Differential Temperature—High (continued)

single instrument failure can preclude the isolation function.

Twelve thermocouples provide input to the Area Ventilation Differential Temperature—High Function. The output of these thermocouples is used to determine the differential temperature. Each channel consists of a differential temperature instrument that receives inputs from thermocouples that are located in the inlet and outlet of the area cooling system and for a total of six available channels (two per area). Six channels are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Area and Area Ventilation Differential Temperature—High Allowable Values are set low enough to detect a leak equivalent to 25 gpm.

These Functions isolate the Group 5 valves.

5.d. SLC System Initiation

The isolation of the RWCU System is required when the SLC System has been initiated to prevent dilution and removal of the boron solution by the RWCU System (Ref. 8). SLC System initiation signals are initiated from the two SLC pump start signals.

There is no Allowable Value associated with this Function since the channels are mechanically actuated based solely on the position of the SLC System initiation switch.

Two channels (one from each pump) of the SLC System Initiation Function are available and are required to be OPERABLE only in MODES 1 and 2, since these are the only MODES where the reactor can be critical, and these MODES are consistent with the Applicability for the SLC System (LCO 3.1.7).

As noted (footnote (b) to Table 3.3.6.1-1), this Function is only required to close one of the RWCU isolation valves since the signals only provide input into one of the two trip systems.

(continued)

DB3 INSERT Function 5.e (2)

The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13). 5

DB4 INSERT Function 5.f

5.f. Drywell Pressure-High

High drywell pressure can indicate a break in the RCPB inside the primary containment. The isolation of some of the primary containment isolation valves on high drywell pressure supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded. The Drywell Pressure-High Function, associated with isolation of the primary containment, is implicitly assumed in the UFSAR accident analysis as these leakage paths are assumed to be isolated post LOCA.

High drywell pressure signals are initiated from pressure transmitters that sense the pressure in the drywell. Four channels of Drywell Pressure-High are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value was selected to be as low as possible without inducing spurious trips. The Allowable Value is chosen to be the same as the RPS Drywell Pressure-High Allowable Value (LCO 3.3.1.1), since this may be indicative of a LOCA inside primary containment.

This Function isolates both RWCU suction valves and one RWCU return valve.

DBI

INSERT FUNCTION 6.b

The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13). | J

TA3

INSERT FUNCTION 7

Traversing Incore Probe System Isolation

7.a. Reactor Vessel Water Level - Low, Level 3 (PA2) | J

Low RPV water level indicates that the capability to cool the fuel may be threatened. The valves whose penetrations communicate with the primary containment are isolated to limit the release of fission products. The isolation of the primary containment on Level 3 supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded. The Reactor Vessel Water Level - Low, Level 3 Function associated with isolation is implicitly assumed in the FSAR analysis as these leakage paths are assumed to be isolated post LOCA. (PA2) J

Reactor Vessel Water Level - Low, Level 3 signals are initiated from level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Two channels of Reactor Vessel Water Level - Low, Level 3 Function are available and are required to be OPERABLE to ensure that no single instrument failure can ~~initiate an inadvertent~~ preclude the isolation ~~actuation~~ function. The isolation function is ensured by the manual shear valve in each penetration. (PA2) (DBI)

The Reactor Vessel Water Level - Low, Level 3 Allowable Value was chosen to be the same as the RPS Level 3 scram Allowable Value (LCO 3.3.1.1), since isolation of these valves is not critical to orderly plant shutdown. The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13). (PA2) (DBI) | J

This Function isolates the ~~Group [x]~~ TIP System isolation ball valves. (DBI)

TA3

INSERT FUNCTION 7 (continued)

7.b. Drywell Pressure - High 1 J

High drywell pressure can indicate a break in the RCPB inside the primary containment. The isolation of some of the primary containment isolation valves on high drywell pressure supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded. The Drywell Pressure - High Function, associated with isolation of the primary containment, is implicitly assumed in the FSAR accident analysis as these leakage paths are assumed to be isolated post LOCA. U DB1

High drywell pressure signals are initiated from pressure transmitters that sense the pressure in the drywell. Two channels of Drywell Pressure - High per Function are available and are required to be OPERABLE to ensure that no single instrument failure can ~~initiate an inadvertent actuation~~ preclude the isolation function. The isolation function is ensured by the manual shear valve in each penetration. RAS DB13

The Allowable Value was selected to be the same as the ~~ECCS~~ Drywell Pressure - High Allowable Value (LCO 3.3.~~5~~.1), since this may be indicative of a LOCA inside primary containment. 1 DB1

This Function isolates the ~~Group [x]~~ TIP System isolation ball valves.

BASES (continued)

ACTIONS

Reviewer's Note: Certain LCO Completion Times are based on approved topical reports. In order for a licensee to use the times, the licensee must justify the Completion Times as required by the staff Safety Evaluation Report (SER) for the topical report.

A Note has been provided to modify the ACTIONS related to primary containment isolation instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable primary containment isolation instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable primary containment isolation instrumentation channel.

A.1

Because of the diversity of sensors available to provide isolation signals and the redundancy of the isolation design, an allowable out of service time of 12 hours for Functions 2.a, 2.b, and 6.b and 24 hours for Functions other than Functions 2.a, 2.b, and 6.b has been shown to be acceptable (Refs. 5 and 6) to permit restoration of any inoperable channel to OPERABLE status. This out of service time is only acceptable provided the associated Function is still maintaining isolation capability (refer to Required Action B.1 Bases). If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action A.1. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue with no further restrictions. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an isolation), Condition C must be entered and its Required Action taken.

(continued)

REVISION

BASES

ACTIONS (continued)

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in redundant automatic isolation capability being lost for the associated penetration flow path(s). The MSL Isolation Functions are considered to be maintaining isolation capability when sufficient channels are OPERABLE or in trip, such that both trip systems will generate a trip signal from the given Function on a valid signal. The other isolation functions are considered to be maintaining isolation capability when sufficient channels are OPERABLE or in trip, such that one trip system will generate a trip signal from the given Function on a valid signal. This ensures that one of the two PCIVs in the associated penetration flow path can receive an isolation signal from the given Function. For Functions 1.a, 1.b, 1.d, and 1.f, this would require both trip systems to have one channel OPERABLE or in trip. For Function 1.c, this would require both trip systems to have one channel, associated with each MSL, OPERABLE or in trip. For Functions 1.e and 1.g, each Function consists of channels that monitor several locations within a given area (e.g., different locations within the main steam tunnel area). Therefore, this would require both trip systems to have one channel per location OPERABLE or in trip. For Functions 2.a, 2.b, 2.d, 2.e, 3.b, 3.c, 4.b, 4.c, 5.e, and 6.b, this would require one trip system to have two channels, each OPERABLE or in trip. For Functions 2.c, 3.a, 3.d, 3.e, 3.f, 3.g, 3.h, 3.i, 4.a, 4.d, 4.e, 4.f, 4.g, 4.h, 4.i, 4.j, 5.a, 5.c, and 6.a, this would require one trip system to have one channel OPERABLE or in trip. For Functions 5.b and 5.c, each Function consists of channels that monitor several different locations. Therefore, this would require one channel per location to be OPERABLE or in trip (the channels are not required to be in the same trip system). The Condition does not include the Manual Initiation Functions (Functions 1.h, 2.d, 3.j, 4.k, and 5.f), since they are not assumed in any accident or transient analysis. Thus, a total loss of manual initiation capability for 24 hours (as allowed by Required Action A.1) is allowed.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The 1 hour Completion Time is acceptable because it minimizes

(continued)

DB1 INSERT ACTION B.1-1

For Functions 1.a, 1.b, 1.d, and 1.f (associated with MSL drain isolation) this would require one trip system to have two channels, each OPERABLE or in trip. For Function 1.c (associated with MSL drain isolation) this will require one trip system to have two channels, associated with each MSL, each OPERABLE or in trip. For Function 1.e this would require one trip system to have two channels, associated with each main steam tunnel area, each to be OPERABLE or in trip. For Functions 2.g, 2.h and 2.i, as noted by footnote (b) to Table 3.3.6.1-1, there is only one trip system provided for each associated penetration. For these penetrations (i.e., hydrogen/oxygen sample and return, and gaseous/particulate sample supply and return) and for Functions 2.g and 2.h, this will require both channels to be OPERABLE or in trip in order to close at least one valve. For Function 2.i, this will require one channel to be OPERABLE or in trip in order to isolate at least one valve. | J

DB1 INSERT ACTION B.1-2

For Function 5.d, this would require that with the SLC initiation switch in start system A or B the associated valve will close. For Functions 7.a and 7.b the logic is arranged in one trip system, therefore this would require both channels to be OPERABLE or in trip, or the manual shear valves to be OPERABLE.

TA3 Insert 6.1

BASES

ACTIONS

G.1 (continued)

may continue if the affected penetration flow path(s) is isolated. Isolating the affected penetration flow path(s) accomplishes the safety function of the inoperable channels. The 24 hour Completion Time is acceptable due to the fact that these Functions (Manual Initiation) are not assumed in any accident or transient analysis in the FSAR. Alternately, if it is not desired to isolate the affected penetration flow path(s) (e.g., as in the case where isolating the penetration flow path(s) could result in a reactor scram), Condition H must be entered and its Required Actions taken.

CLB1 the penetrations associated with

DB1

H.1 and H.2

If the channel is not restored to OPERABLE status or placed in trip within the allowed Completion Time, or any Required Action of Condition F or G is not met and the associated Completion Time has expired, the plant must be placed in a MODE or other specified condition in which the LCO does not apply. This is done by placing the plant in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

I.1 and I.2

PA6

If the channel is not restored to OPERABLE status or placed in trip within the allowed Completion Time, the associated SLC subsystem(s) is declared inoperable or the RWCU System is isolated. Since this Function is required to ensure that the SLC System performs its intended function, sufficient remedial measures are provided by declaring the associated SLC subsystems inoperable or isolating the RWCU System. 1 (J)

The 1 hour Completion Time is acceptable because it minimizes risk while allowing sufficient time for personnel to isolate the RWCU System.

(continued)

REVISION J

BASES

ACTIONS (continued)

J.1 and J.2

If the channel is not restored to OPERABLE status or placed in trip within the allowed Completion Time, the associated penetration flow path should be closed. However, if the shutdown cooling function is needed to provide core cooling, these Required Actions allow the penetration flow path to remain unisolated provided action is immediately initiated to restore the channel to OPERABLE status or to isolate the RHR Shutdown Cooling System (i.e., provide alternate decay heat removal capabilities so the penetration flow path can be isolated). Actions must continue until the channel is restored to OPERABLE status or the RHR Shutdown Cooling System is isolated.

SURVEILLANCE REQUIREMENTS

Reviewer's Note: Certain Frequencies are based on approved topical reports. In order for a licensee to use these Frequencies, the licensee must justify the Frequencies as required by the staff SER for the topical report.

As noted at the beginning of the SRs, the SRs for each Primary Containment Isolation instrumentation Function are found in the SRs column of Table 3.3.6.1-1.

The Surveillances are modified by a Note to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains trip capability. Upon completion of the Surveillance, or expiration of the 6 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken. This Note is based on the reliability analysis (Refs. 5 and 6) assumption of the average time required to perform channel surveillance. That analysis demonstrated that the 6 hour testing allowance does not significantly reduce the probability that the PCIVs will isolate the penetration flow path(s) when necessary.

PA4 (Note1) PA1 2 CLB2 as follows: (a) for Functions 2.b, 2.g, 7.a, and 7.b; and (b) for Functions other than 2.b, 2.g, 7.a, and 7.b 8 DB1 X1 J Insert SR NOTE CLB2

SR 3.3.6.1.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A

(continued)

REVISION F J

CLB2

INSERT SR Note

For Functions 2.d and 2.g, this allowance is permitted since the associated penetration flow path(s) involve sample lines which form a closed system with the primary containment atmosphere. For Functions 7.a and 7.b, this is permitted since the associated penetrations can be manually isolated if needed.

TA1

INSERT SR 3.3.6.1.2

A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. 1

BASES

SURVEILLANCE REQUIREMENTS

Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the

SR 3.3.6.1.7 (continued)

Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency.

Therefore, the Frequency was found to be acceptable from a reliability standpoint.

SR 3.3.6.1.8

This SR ensures that the individual channel response times are less than or equal to the maximum values assumed in the accident analysis. Testing is performed only on channels where the assumed response time does not correspond to the diesel generator (DG) start time. For channels assumed to respond within the DG start time, sufficient margin exists in the [10] second start time when compared to the typical channel response time (milliseconds) so as to assure adequate response without a specific measurement test. The instrument response times must be added to the PCIV closure times to obtain the ISOLATION SYSTEM RESPONSE TIME.

ISOLATION SYSTEM RESPONSE TIME acceptance criteria are included in Reference 7. This test may be performed in one measurement, or in overlapping segments, with verification that all components are tested.

INSERT SR 3.3.6.1.8-1

A Note to the Surveillance states that the radiation detectors may be excluded from ISOLATION SYSTEM RESPONSE TIME testing. This Note is necessary because of the difficulty of generating an appropriate detector input signal and because the principles of detector operation virtually ensure an instantaneous response time. Response times for radiation detector channels shall be measured from detector output or the input of the first electronic component in the channel.

INSERT SR 3.3.6.1.8-2

ISOLATION SYSTEM RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS. The 18 month Frequency is consistent with the typical industry refueling cycle and is based upon plant operating experience that shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

(continued)

REVISION J

{TA2} INSERT SR 3.3.6.1.8-1

ISOLATION SYSTEM RESPONSE TIME may be verified by actual response time measurements in any series of sequential, overlapping, or total channel measurements. However, the sensors for Functions 1.a, 1.b, and 1.c are allowed to be excluded from specific ISOLATION SYSTEM RESPONSE TIME measurement if the conditions of Reference 8 are satisfied. If these conditions are satisfied, sensor response time may be allocated based on either assumed design sensor response time or the manufacturer's stated design response time. When the requirements of Reference 8 are not satisfied, sensor response time must be measured. Furthermore, measurement of the instrument loops response time for Functions 1.a, 1.b, and 1.c is not required if the conditions of Reference 9 are satisfied. For all other Functions, the measurement of instrument loop response times may be excluded if the conditions of Reference 8 are satisfied.

{CLB6} INSERT SR 3.3.6.1.8-2

A Note requires STAGGERED TEST BASIS Frequency to be determined based on 2 channels. This will ensure that all required channels are tested during two Surveillance Frequency intervals. For Functions 1.a and 1.b, two channels must be tested during each test, while for Function 1.c, eight channels must be tested.

BASES (continued)

REFERENCES

1. FSAR, Section [6.3].

2. FSAR, Chapter [15].

3. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment," November 1987.

4. FSAR, Section [4.2.3.4.3].

5. NEDC-31677P-A, "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation," July 1990.

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

7. FSAR, Section [7.3].

CLB4 DB6 INSERT REF

10. NEDO-32291-A, System Analyses For the Elimination of Selected Response Time Testing Requirements, October 1995.

11. NRC letter dated October 28, 1996, Issuance of Amendment 235 to Facility Operating License DPR-59 for James A. FitzPatrick Nuclear Power Plant.

12. NRC Bulletin 90-01, Supplement 1, Loss of Fill-Oil in Transmitters Manufactured by Rosemount, December 1992.

13. Drawing 11825-5.01-15D, Rev. D, Reactor Assembly Nuclear Boiler, (GE Drawing 919D690BD).

3.3 INSTRUMENTATION

3.3.6.1 Primary Containment Isolation Instrumentation

LCO 3.3.6.1 The primary containment isolation instrumentation for each Function in Table 3.3.6.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.6.1-1.

ACTIONS

------------------------------------NOTES------------------------------------

1. Penetration flow paths may be unisolated intermittently under administrative controls.

2. Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1 Place channel in trip.	12 hours for Functions 2.a, 2.b, 2.d, 2.g, 5.e, 5.f, 6.b, 7.a, and 7.b AND 24 hours for Functions other than Functions 2.a, 2.b, 2.d, 2.g, 5.e, 5.f, 6.b, 7.a, and 7.b
B. One or more Functions with isolation capability not maintained.	B.1 Restore isolation capability.	1 hour

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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. Required Action and associated Completion Time of Condition F or G not met. OR As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	H.1 Be in MODE 3. AND H.2 Be in MODE 4.	12 hours 36 hours
I. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	I.1 Declare associated standby liquid control subsystem (SLC) inoperable. OR I.2 Isolate the Reactor Water Cleanup System.	1 hour 1 hour
J. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	J.1 Initiate action to restore channel to OPERABLE status. OR J.2 Initiate action to isolate the Residual Heat Removal (RHR) Shutdown Cooling System.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

------------------------------------NOTES------------------------------------

1. Refer to Table 3.3.6.1-1 to determine which SRs apply for each Primary Containment Isolation Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed as follows: (a) for up to 6 hours for Functions 2.d, 2.g, 7.a, and 7.b; and (b) for up to 6 hours for Functions other than 2.d, 2.g, 7.a, and 7.b provided the associated Function maintains isolation capability.

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SURVEILLANCE		FREQUENCY
SR 3.3.6.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.1.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.6.1.3	-----------------NOTE----------------- For Functions 1.f and 2.f, radiation detectors are excluded. -------------------------------------- Perform CHANNEL CALIBRATION.	92 days
SR 3.3.6.1.4	Calibrate the trip units.	184 days
SR 3.3.6.1.5	Perform CHANNEL CALIBRATION.	24 months
SR 3.3.6.1.6	Calibrate the radiation detectors.	24 months

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.6.1.7	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months
SR 3.3.6.1.8	-----------------NOTE------------------ "n" equals 2 channels for the purpose of determining the STAGGERED TEST BASIS Frequency. --------------------------------------- Verify the ISOLATION INSTRUMENTATION RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

BASES

BACKGROUND

5. Reactor Water Cleanup System Isolation (continued)

RWCU return penetration outboard valve. The trip system associated with the SLC System Initiation Function is connected to the outboard RWCU suction valve and the outboard RWCU return penetration valve.

6. Shutdown Cooling System Isolation

The Reactor Vessel Water Level – Low (Level 3) Function (Function 6.b) receives input from four reactor vessel water level channels. The outputs from the reactor vessel water level channels are connected to two two-out-of-two trip systems. Each of the two trip systems is connected to one of the two valves on the RHR shutdown cooling pump suction penetration and on one of the two inboard LPCI injection valves if in shutdown cooling mode. The Reactor Pressure – High Function (Function 6.a) receives input from two channels, with each channel providing input into each trip system using a one-out-of-two logic. However, only one channel input is required to be OPERABLE for a trip system to be considered OPERABLE. Each of the two trip systems is connected to one of the two valves on the shutdown cooling pump suction penetration.

7. Traversing Incore Probe System Isolation

The Reactor Vessel Water Level – Low (Level 3) Isolation Function receives input from two reactor vessel water level channels. The outputs from the reactor vessel water level channels are connected into one two-out-of-two logic trip system. The Drywell Pressure – High Isolation function receives input from two drywell pressure channels. The outputs from the drywell pressure channels are connected into one two-out-of-two logic trip system.

When either Isolation Function actuates, the TIP drive mechanisms will withdraw the TIPs, if inserted, and close the inboard TIP system isolation ball valves when the TIPs are fully withdrawn. The outboard TIP system isolation valves are manual shear valves.

(continued)

BASES

APPLICABILITY SAFETY ANALYSES, LCO, and APPLICABILITY

1.a. Reactor Vessel Water Level - Low Low Low (Level 1) (continued)

that offsite dose limits are not exceeded for a DBA.

Reactor vessel water level signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels of Reactor Vessel Water Level - Low Low Low (Level 1) Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Reactor Vessel Water Level - Low Low Low (Level 1) Allowable Value is chosen to ensure that the MSLs isolate on a potential loss of coolant accident (LOCA) to prevent offsite doses from exceeding 10 CFR 100 limits. In addition, the setting is low enough to allow the removal of heat from the reactor for a predetermined time following a scram, prevent isolation on a partial loss of feedwater and to reduce challenges to the safety/relief valves (S/RVs). The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13).

This Function isolates the MSIVs and MSL drain valves.

1.b. Main Steam Line Pressure - Low

Low MSL pressure indicates that there may be a problem with the turbine pressure regulation, which could result in a low reactor vessel water level condition and the RPV cooling down at a rate greater than 100°F/hr if the pressure loss is allowed to continue. The Main Steam Line Pressure - Low Function is directly assumed in the analysis of the pressure regulator failure (Ref. 2). For this event, the closure of the MSIVs ensures that the RPV temperature change limit (100°F/hr) is not reached. In addition, this Function supports actions to ensure that Safety Limit 2.1.1.1 is not exceeded. (This Function closes the MSIVs prior to pressure decreasing below 785 psig, which results in a scram due to MSIV closure, thus reducing reactor power to < 25% RTP.)

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.b. Main Steam Line Pressure - Low (continued)

The MSL low pressure signals are initiated from four transmitters that are connected to the MSL pressure averaging manifold. The transmitters are arranged such that, even though physically separated from each other, each transmitter is able to detect low MSL pressure. Four channels of Main Steam Line Pressure - Low Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value was selected to be high enough to detect a pressure regulator malfunction and prevent excessive RPV depressurization. In addition, the setting is low enough to prevent spurious isolations.

The Main Steam Line Pressure - Low Function is only required to be OPERABLE in MODE 1 since this is when the assumed transient can occur (Ref. 2). The Function is automatically bypassed when the reactor mode switch is not in the run position.

This Function isolates the MSIVs and MSL drain valves.

1.c. Main Steam Line Flow - High

Main Steam Line Flow - High is provided to detect a break of the MSL and to initiate closure of the MSIVs. If the steam were allowed to continue flowing out of the break, the reactor would depressurize and the core could uncover. If the RPV water level decreases too far, fuel damage could occur. Therefore, the isolation is initiated on high flow to prevent or minimize core damage. The Main Steam Line Flow - High Function is directly assumed in the analysis of the main steam line break (MSLB) (Ref. 3). The isolation action, along with the scram function of the Reactor Protection System (RPS), ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46 and offsite doses do not exceed the 10 CFR 100 limits.

The MSL flow signals are initiated from 16 transmitters that are connected to the four MSLs. The transmitters are arranged such that, even though physically separated from each other, all four connected to one MSL would be able to

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.f. Main Steam Line Radiation - High (continued)

Function 2.f) to ensure that the assumptions utilized to determine that acceptable offsite doses resulting from a control rod drop accident (CRDA) are maintained.

Main Steam Line Radiation - High signals are generated from four radiation elements and associated monitors, which are located near the main steam lines in the steam tunnel. Four instrumentation channels of the Main Steam Line Radiation - High Function are available and required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value was selected to be low enough that a high radiation trip results from the fission products released in the CRDA. In addition, the setting is adjusted high enough above the background radiation level in the vicinity of the main steam lines so that spurious trips are avoided at rated power. As noted (footnote (b) to Table 3.3.6.1-1), the channels are only required to be OPERABLE in MODES 1 and 2 with THERMAL POWER ≤ 10% RTP. When THERMAL POWER is > 10% RTP, there is no possible control rod configuration that results in a control rod worth that could exceed the fuel damage limit during a CRDA (Refer to the Bases for Function 2 (Rod Worth Minimizer) of LCO 3.3.2.1, "Control Rod Block Instrumentation"). In MODES 3 and 4, all control rods are required to be inserted into the core; therefore, a CRDA cannot occur. In MODE 5, since only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will be subcritical.

This Function isolates the MSL drain valves.

Primary Containment Isolation

2.a, 2.g. Reactor Vessel Water Level - Low (Level 3) (J)

Low RPV water level indicates that the capability to cool the fuel may be threatened. The valves whose penetrations communicate with the primary containment are isolated to limit the release of fission products. The isolation of the primary containment on Level 3 supports actions to ensure

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.a, 2.g. Reactor Vessel Water Level - Low (Level 3) (continued)

that offsite dose limits of 10 CFR 100 are not exceeded. The Reactor Vessel Water Level - Low (Level 3) Function associated with isolation is implicitly assumed in the UFSAR analysis as these leakage paths are assumed to be isolated post LOCA.

Reactor Vessel Water Level - Low (Level 3) signals are initiated from level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. For Function 2.a, four channels of Reactor Vessel Water Level - Low (Level 3) Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function. For Function 2.g, two channels of Reactor Vessel Water Level - Low (Level 3) are required to be OPERABLE for each hydrogen/oxygen and gaseous/particulate sample supply and return penetration to ensure these penetrations can be isolated.

The Reactor Vessel Water Level - Low (Level 3) Allowable Value was chosen to be the same as the RPS Level 3 scram Allowable Value (LCO 3.3.1.1), since the capability to cool the fuel may be threatened. The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13).

This Function isolates the valves listed in Reference 1.

2.b, 2.d. Drywell Pressure - High

High drywell pressure can indicate a break in the RCPB inside the primary containment. The isolation of some of the primary containment isolation valves on high drywell pressure supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded. The Drywell Pressure - High Function, associated with isolation of the primary

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.b, 2.d. Drywell Pressure - High (continued)

containment, is implicitly assumed in the UFSAR accident analysis as these leakage paths are assumed to be isolated post LOCA.

High drywell pressure signals are initiated from pressure transmitters that sense the pressure in the drywell. For Function 2.b, four channels of Drywell Pressure - High are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function. For Function 2.d, two channels of Drywell Pressure - High are required to be OPERABLE for each hydrogen/oxygen and gaseous/particulate sample supply and return penetration to ensure these penetrations can be isolated.

The Allowable Value was selected to be as low as possible without inducing spurious trips. The Allowable Value is chosen to be the same as the RPS Drywell Pressure - High Allowable Value (LCO 3.3.1.1), since this may be indicative of a LOCA inside primary containment.

These Functions isolate the valves listed in Reference 1.

2.c. Containment Radiation - High

High containment radiation indicates possible gross failure of the fuel cladding. Therefore, when Containment Radiation - High is detected, an isolation is initiated to limit the release of fission products. However, this Function is not assumed in any accident or transient analysis in the UFSAR because other leakage paths (e.g., MSIVs) are more limiting.

The containment radiation signals are initiated from radiation detectors that are located in the drywell. Two channels of Containment Radiation - High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value is low enough to promptly detect gross failures in the fuel cladding. However, the setting is high enough to avoid spurious isolation.

This Function isolates the containment vent and purge valves.

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2.e. Reactor Vessel Water Level - Low Low Low (Level 1)

Low reactor pressure vessel (RPV) water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, isolation of the recirculation loop sample valves occurs to prevent offsite dose limits from being exceeded. The Reactor Vessel Water Level - Low Low Low (Level 1) Function is one of the many Functions assumed to be OPERABLE and capable of providing isolation signals. The Reactor Vessel Water Level - Low Low Low (Level 1) Function associated with isolation is assumed in the analysis of the recirculation line break (Ref. 3). The isolation of the recirculation loop sample valves on Level 1 supports actions to ensure that offsite dose limits are not exceeded for a DBA.

Reactor vessel water level signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels of Reactor Vessel Water Level - Low Low Low (Level 1) Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Reactor Vessel Water Level - Low Low Low (Level 1) Allowable Value is chosen to ensure that the recirculation loop sample valves close on a potential loss of coolant accident (LOCA) to prevent offsite doses from exceeding 10 CFR 100 limits. The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13). J

This Function isolates the recirculation loop sample valves.

2.f. Main Steam Line Radiation - High

The Main Steam Line Radiation-High isolation signal has been removed from the MSIV isolation logic circuitry (Ref. 1); however, this isolation Function has been retained for the recirculation loop sample valves to ensure that the assumptions utilized to determine that acceptable offsite doses resulting from a CRDA are maintained.

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

<u>2.f. Main Steam Line Radiation-High</u> (continued)

Main Steam Line Radiation-High signals are generated from four radiation elements and associated monitors, which are located near the main steam lines in the steam tunnel. Four Instrumentation channels of the Main Steam Line Radiation-High Function are available and required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Value was selected to be low enough that a high radiation trip results from the fission products released in the Design Basis CRDA. In addition, the setting is adjusted high enough above the background radiation level in the vicinity of the main steam lines so that spurious trips are avoided at rated power. As noted (footnote (b) to Table 3.3.6.1-1), the channels are only required to be OPERABLE in MODES 1 and 2 with THERMAL POWER ≤ 10% RTP. When THERMAL POWER is > 10% RTP, there is no possible control rod configuration that results in a control rod worth that could exceed the fuel damage limit during a CRDA (Refer to the Bases for Function 2 (Rod Worth Minimizer) of LCO 3.3.2.1). In MODES 3 and 4, all control rods are required to be inserted into the core; therefore, a CRDA cannot occur. In MODE 5, since only a single control rod can be withdrawn from a core cell containing fuel assemblies, adequate SDM ensures that the consequences of a CRDA are acceptable, since the reactor will be subcritical.

This Function isolates the recirculation loop sample valves.

<u>High Pressure Coolant Injection and Reactor Core Isolation Cooling Systems Isolation</u>

<u>3.a, 4.a. HPCI and RCIC Steam Line Flow-High</u>

Steam Line Flow-High Functions are provided to detect a break of the RCIC or HPCI steam lines and initiate closure of the steam line isolation valves of the appropriate system. If the steam is allowed to continue flowing out of the break, the reactor will depressurize and the core can uncover. Therefore, the isolations are initiated on high flow to prevent or minimize core damage. The isolation action, along with the scram function of the RPS, ensures

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.a, 4.a. HPCI and RCIC Steam Line Flow - High (continued)

that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46. Specific credit for these Functions is not assumed in any UFSAR accident analyses since the bounding analysis is performed for large breaks such as recirculation and MSL breaks. However, these instruments prevent the RCIC or HPCI steam line breaks from becoming bounding.

The HPCI and RCIC Steam Line Flow - High signals are initiated from transmitters (two for HPCI and two for RCIC) that are connected to the system steam lines. Two channels of both HPCI and RCIC Steam Line Flow - High Functions are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Values are chosen to be low enough to ensure a timely detection of a turbine steam line break so that the trip occurs to prevent fuel damage and maintains the MSLB event as the bounding event. The setting is adjusted high enough to avoid spurious isolations during HPCI and RCIC startups.

These Functions isolate the valves, as appropriate, as listed in Reference 1.

3.b, 4.b. HPCI and RCIC Steam Supply Line Pressure - Low

Low steam pressure indicates that the pressure of the steam in the HPCI or RCIC turbine may be too low to continue operation of the associated system's turbine. These isolations are for equipment protection and are not assumed in any transient or accident analysis in the UFSAR. However, they also provide a diverse signal to indicate a possible system break. These instruments are included in Technical Specifications (TS) because of the potential for risk due to possible failure of the instruments preventing HPCI and RCIC initiations (Ref. 5).

The HPCI and RCIC Steam Supply Line Pressure - Low signals are initiated from transmitters (four for HPCI and four for RCIC) that are connected to the system steam line. Four channels of both HPCI and RCIC Steam Supply Line

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.b, 4.b. HPCI and RCIC Steam Supply Line Pressure - Low (continued)

Pressure - Low Functions are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Values are selected to be high enough to prevent damage to the system's turbine and low enough to ensure HPCI and RCIC Systems remain OPERABLE.

These Functions isolate the valves, as appropriate, as listed in Reference 1.

3.c, 4.c. HPCI and RCIC Turbine Exhaust Diaphragm Pressure - High

High turbine exhaust diaphragm pressure could indicate that the turbine rotor is not turning, or there is a broken turbine blading or shrouding, thus allowing reactor pressure to act on the turbine exhaust line. The system is isolated to prevent overpressurization of the turbine exhaust line. These isolations are for equipment protection and are not assumed in any transient or accident analysis in the UFSAR. These instruments are included in the TS because of the potential for risk due to possible failure of the instruments preventing HPCI and RCIC initiations (Ref. 5).

The HPCI and RCIC Turbine Exhaust Diaphragm Pressure - High signals are initiated from switches (four for HPCI and four for RCIC) that are connected to the area between the rupture diaphragms on each system's turbine exhaust line. Four channels of both HPCI and RCIC Turbine Exhaust Diaphragm Pressure - High Functions are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Values are high enough to prevent damage to low pressure components in the turbine exhaust pathway. The settings are adjusted low enough to avoid isolation of the system's turbine.

These Functions isolate the valves, as appropriate, as listed in Reference 1.

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

3.d, 3.e, 3.f, 3.g, 3.h, 3.i, 3.j, 4.d, 4.e, 4.f. HPCI and RCIC Area Temperature - High

HPCI and RCIC Area temperatures are provided to detect a leak from the associated system steam piping. The isolation occurs when a very small leak has occurred and is diverse to the high flow instrumentation. If the small leak is allowed to continue without isolation, offsite dose limits may be reached. These Functions are not assumed in any UFSAR transient or accident analysis, since bounding analyses are performed for large breaks such as recirculation or MSL breaks.

Area Temperature - High signals are initiated from resistance temperature detectors (RTDs) that are appropriately located to protect the system that is being monitored. Two instruments monitor each area for a total of 16 channels for HPCI and 8 channels for RCIC. All channels for each HPCI and RCIC Area Temperature - High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Values are set high enough above normal operating levels to avoid spurious operation but low enough to provide timely detection of a steam leak.

These Functions isolate the valves, as appropriate, as listed in Reference 1.

Reactor Water Cleanup (RWCU) System Isolation

5.a, 5.b, 5.c. RWCU Area Temperatures - High

RWCU area temperatures are provided to detect a leak from the RWCU System. The isolation occurs even when very small leaks have occurred. If the small leak continues without isolation, offsite dose limits may be reached. Credit for these instruments is not taken in any transient or accident analysis in the UFSAR, since bounding analyses are performed for large breaks such as recirculation or MSL breaks.

Area temperature signals are initiated from temperature elements that are located in the area that is being monitored. Eight thermocouples provide input to the Area Temperature - High Functions (two per area or room). Eight channels are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

5.a, 5.b, 5.c. RWCU Area Temperatures - High (continued)

function. The Area Temperature - High Allowable Values are set high enough to avoid spurious isolation yet low enough to provide timely detection and isolation of a break in the RWCU System.

These Functions isolates both RWCU suction valves and the return valve.

5.d. SLC System Initiation

The isolation of the RWCU System is required when the SLC System has been initiated to prevent dilution and removal of the boron solution by the RWCU System (Ref. 6). The RWCU isolation signal is initiated when the control room SLC initiation switch is in any position other than stop.

There is no Allowable Value associated with this Function since the channels are mechanically actuated based solely on the position of the SLC System initiation switch.

Two channels (start system A or start system B) of the SLC System Initiation Function are available and are required to be OPERABLE only in MODES 1 and 2, since these are the only MODES where the reactor can be critical, and these MODES are consistent with the Applicability for the SLC System (LCO 3.1.7).

As noted (footnote (d) to Table 3.3.6.1-1), this Function is only required to close one of the RWCU suction isolation valves and one return isolation valve since the signals only provide input into one of the two trip systems.

5.e. Reactor Vessel Water Level - Low (Level 3)

Low RPV water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, isolation of some interfaces with the reactor vessel occurs to isolate the potential sources of a break. The isolation of the RWCU System on Level 3 supports actions to ensure that the fuel peak cladding temperature remains below the limits of

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

5.e. Reactor Vessel Water Level - Low (Level 3) (continued)

10 CFR 50.46. The Reactor Vessel Water Level - Low (Level 3) Function associated with RWCU isolation is not directly assumed in the UFSAR safety analyses because the RWCU System line break is bounded by breaks of larger systems (recirculation and MSL breaks are more limiting).

Reactor Vessel Water Level - Low (Level 3) signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels of Reactor Vessel Water Level - Low (Level 3) Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Reactor Vessel Water Level - Low (Level 3) Allowable Value was chosen to be the same as the RPS Reactor Vessel Water Level - Low (Level 3) Allowable Value (LCO 3.3.1.1), since the capability to cool the fuel may be threatened. The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13). J

This Function isolates both RWCU suction valves and the RWCU return valve.

5.f. Drywell Pressure - High

High drywell pressure can indicate a break in the RCPB inside the primary containment. The isolation of some of the primary containment isolation valves on high drywell pressure supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded. The Drywell Pressure - High Function, associated with isolation of the primary containment, is implicitly assumed in the UFSAR accident analysis as these leakage paths are assumed to be isolated post LOCA.

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

6.b. Reactor Vessel Water Level - Low (Level 3)

Low RPV water level indicates that the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, isolation of some reactor vessel interfaces occurs to begin isolating the potential sources of a break. The Reactor Vessel Water Level - Low (Level 3) Function associated with RHR Shutdown Cooling System isolation is not directly assumed in safety analyses because a break of the RHR Shutdown Cooling System is bounded by breaks of the reactor water recirculation system and MSL. The RHR Shutdown Cooling System isolation on Level 3 supports actions to ensure that the RPV water level does not drop below the top of the active fuel during a vessel draindown event caused by a leak (e.g., pipe break or inadvertent valve opening) in the RHR Shutdown Cooling System.

Reactor Vessel Water Level - Low (Level 3) signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels (two channels per trip system) of the Reactor Vessel Water Level - Low (Level 3) Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function. As noted (footnote (e) to Table 3.3.6.1-1), only one trip system of the Reactor Vessel Water Level - Low (Level 3) Function are required to be OPERABLE in MODES 4 and 5, provided the RHR Shutdown Cooling System integrity is maintained. System integrity is maintained provided the piping is intact and no maintenance or other activity is being performed that has the potential for draining the reactor vessel through the system.

The Reactor Vessel Water Level - Low (Level 3) Allowable Value was chosen to be the same as the RPS Reactor Vessel Water Level - Low (Level 3) Allowable Value (LCO 3.3.1.1), since the capability to cool the fuel may be threatened. The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13). J

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BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

6.b. Reactor Vessel Water Level - Low (Level 3) (continued)

The Reactor Vessel Water Level - Low (Level 3) Function is only required to be OPERABLE in MODES 3, 4, and 5 to prevent this potential flow path from lowering the reactor vessel level to the top of the fuel. In MODES 1 and 2, another isolation (i.e., Reactor Pressure - High) and administrative controls ensure that this flow path remains isolated to prevent unexpected loss of inventory via this flow path.

This Function isolates both RHR shutdown cooling pump suction valves and the inboard LPCI injection valves.

Traversing Incore Probe System Isolation

7.a. Reactor Vessel Water Level- Low (Level 3)

Low RPV water level indicates that the capability to cool the fuel may be threatened. The valves whose penetrations communicate with the primary containment are isolated to limit the release of fission products. The isolation of the primary containment on Level 3 supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded. The Reactor Vessel Water Level- Low (Level 3) Function associated with isolation is implicitly assumed in the UFSAR analysis as these leakage paths are assumed to be isolated post LOCA.

Reactor Vessel Water Level - Low (Level 3) signals are initiated from level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Two channels of Reactor Vessel Water Level - Low (Level 3) Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function. The isolation function is ensured by the manual shear valve in each penetration.

The Reactor Vessel Water Level - Low (Level 3) Allowable Value was chosen to be the same as the RPS Level 3 scram Allowable Value (LCO 3.3.1.1), since isolation of these valves is not critical to orderly plant shutdown. The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 13).

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

7.a. Reactor Vessel Water Level-Low (Level 3) (continued)

This Function isolates the TIP System isolation ball valves.

7.b. Drywell Pressure-High

High drywell pressure can indicate a break in the RCPB inside the primary containment. The isolation of some of the primary containment isolation valves on high drywell pressure supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded. The Drywell Pressure-High Function, associated with isolation of the primary containment, is implicitly assumed in the UFSAR accident analysis as these leakage paths are assumed to be isolated post LOCA.

High drywell pressure signals are initiated from pressure transmitters that sense the pressure in the drywell. Two channels of Drywell Pressure-High are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function. The isolation function is ensured by the manual shear valve in each penetration.

The Allowable Value is chosen to be the same as the RPS Drywell Pressure-High Allowable Value (LCO 3.3.1.1), since this may be indicative of a LOCA inside primary containment.

This Function isolates the TIP System isolation ball valves.

ACTIONS

The ACTIONS are modified by two Notes. Note 1 allows penetration flow path(s) to be unisolated intermittently under administrative controls. These controls consist of stationing a dedicated operator at the controls of the valve, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for primary containment isolation is indicated. Note 2 has been provided to modify the ACTIONS related to primary containment isolation instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the

(continued)

ACTIONS (continued)

Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable primary containment isolation instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable primary containment isolation instrumentation channel.

A.1

Because of the diversity of sensors available to provide isolation signals and the redundancy of the isolation design, an allowable out of service time of 12 hours for Functions 2.a, 2.b, 2.d, 2.g, 5.e, 5.f, 6.b, 7.a and 7.b (which have components common to RPS) and 24 hours for Functions other than Functions 2.a, 2.b, 2.d, 2.g, 5.e, 5.f, 6.b, 7.a and 7.b has been shown to be acceptable (Refs. 6 and 7) to permit restoration of any inoperable channel to OPERABLE status. This out of service time is only acceptable provided the associated Function is still maintaining isolation capability (refer to Required Action B.1 Bases). If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action A.1. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue with no further restrictions. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an isolation), Condition C must be entered and its Required Action taken.

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in redundant isolation capability being lost for the associated penetration flow path(s). The MSL Isolation Functions (associated with MSIV isolation) are considered to be maintaining isolation capability when sufficient channels are OPERABLE or in trip (or the associated trip system in trip), such that both trip systems will generate a trip signal from the given Function on a valid signal. The other

(continued)

BASES

ACTIONS

B.1 (continued)

isolation functions are considered to be maintaining isolation capability when sufficient channels are OPERABLE or in trip, such that one trip system will generate a trip signal from the given Function on a valid signal. This ensures that at least one of the PCIVs in the associated penetration flow path can receive an isolation signal from the given Function. For Functions 1.a, 1.b, and 1.d (associated with MSIV isolation), this would require both trip systems to have one channel OPERABLE or in trip. For Function 1.c (associated with MSIV isolation), this would require both trip systems to have one channel, associated with each MSL, OPERABLE or in trip. For Function 1.e, four areas are monitored by four channels (e.g., different locations within the main steam tunnel area). Therefore, this would require both trip systems to have one channel per location OPERABLE or in trip (associated with MSIV isolation). For Functions 1.a, 1.b, 1.d, and 1.f (associated with MSL drain isolation) this would require one trip system to have two channels, each OPERABLE or in trip. For Function 1.c (associated with MSL drain isolation) this will require one trip system to have two channels, associated with each MSL, each OPERABLE or in trip. For Function 1.e this would require one trip system to have two channels, associated with each main steam tunnel area, each to be OPERABLE or in trip. For Functions 2.d and 2.g, as noted by footnote (c) to Table 3.3.6.1-1, there is only one trip system provided for each associated penetration. For these penetrations (i.e., hydrogen/oxygen sample and return, and gaseous/particulate sample supply and return), this will require both channels to be OPERABLE or in trip in order to close at least one valve. For Functions 2.a, 2.b, 2.e, 2.f, 3.b, 3.c, 4.b, 4.c, 5.e, 5.f, and 6.b, this would require one trip system to have two channels, each OPERABLE or in trip. For Functions 2.c, 3.a, 3.d, 3.e, 3.f, 3.g, 3.h, 3.i, 4.a, 4.d, 4.e, 5.a, 5.c, and 6.a, this would require one trip system to have one channel OPERABLE or in trip. For Functions 3.j, 4.f, and 5.b each Function consists of channels that monitor two different locations. Therefore, this would require one channel per location to be OPERABLE or in trip (the channels are not required to be in the same trip system). For Function 5.d, this would require that with the SLC initiation switch in start system A or B the associated valve will close. For Function 7.a and 7.b the logic is arranged in one trip system, therefore this would require both channels to be OPERABLE or in trip, or the manual shear valves to be OPERABLE.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

As noted (Note 1) at the beginning of the SRs, the SRs for each Primary Containment Isolation instrumentation Function are found in the SRs column of Table 3.3.6.1-1.

The Surveillances are modified by Note 2 to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours as follows: (a) for Functions 2.d, 2.g, 7.a, and 7.b; and (b) for Functions other than 2.d, 2.g, 7.a, and 7.b provided the associated Function maintains trip capability. Upon completion of the Surveillance, or expiration of the 6 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken. This Note is based on the reliability analysis (Refs. 7 and 8) assumption of the average time required to perform channel surveillance. That analysis demonstrated that the 6 hour testing allowance does not significantly reduce the probability that the PCIVs will isolate the penetration flow path(s) when necessary. For Functions 2.d and 2.g, this allowance is permitted since the associated penetration flow path(s) involve sample lines which form a closed system with the primary containment atmosphere. For Functions 7.a and 7.b, this is permitted since the associated penetrations can be manually isolated if needed.

SR 3.3.6.1.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.1.1 (continued)

Channel agreement criteria are determined by the plant staff based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the instrument has drifted outside its limit.

The Frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the channels required by the LCO.

SR 3.3.6.1.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The 92 day Frequency of SR 3.3.6.1.2 is based on the reliability analysis described in References 7 and 8.

SR 3.3.6.1.3, SR 3.3.6.1.5, and SR 3.3.6.1.6

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology. SR 3.3.6.1.6 however is only a calibration of the radiation detectors using a standard radiation source.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.1.8 (continued)

series of sequential, overlapping, or total channel measurements. However, the sensors for Functions 1.a, 1.b, and 1.c are excluded from specific ISOLATION SYSTEM RESPONSE TIME measurement since the conditions of Reference 10 are satisfied. For Functions 1.a, 1.b, and 1.c, sensor response time may be allocated based on either assumed design sensor response time or the manufacturer's stated design response time.

ISOLATION INSTRUMENTATION RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS. A Note requires STAGGERED TEST BASIS Frequency to be determined based on 2 channels. This will ensure that all required channels are tested during two Surveillance Frequency intervals. For Functions 1.a and 1.b, two channels must be tested during each test, while for Function 1.c, eight channels must be tested. The 24 month Frequency is consistent with the refueling cycle and is based upon plant operating experience that shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

REFERENCES

1. UFSAR, Table 7.3-1.
2. UFSAR, Section 14.5.
3. UFSAR, Section 14.6.
4. 10 CFR 50.36(c)(2)(ii).
5. NEDO-31466, Technical Specification Screening Criteria Application and Risk Assessment, November 1987.
6. UFSAR, Section 3.9.3.
7. NEDC-31677P-A, Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation, July 1990.
8. NEDC-30851P-A, Supplement 2, Technical Specifications Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation, March 1989.
9. UFSAR, Table 7.3-12.

(continued)

BASES

REFERENCES (continued)

10. NEDO-32291-A, System Analyses For the Elimination of Selected Response Time Testing Requirements, October 1995.

11. NRC letter dated October 28, 1996, Issuance of Amendment 235 to Facility Operating License DPR-59 for James A. FitzPatrick Nuclear Power Plant.

12. NRC Bulletin 90-01, Supplement 1, Loss of Fill-Oil in Transmitters Manufactured by Rosemount, December 1992.

13. Drawing 11825-5.01-15D, Rev. D, Reactor Assembly Nuclear Boiler, (GE Drawing 919D690BD).

ADMINISTRATIVE CHANGES

A5 (continued)

placed in the trip condition. In this condition, the equipment is still inoperable but has accomplished the required safety function. Therefore, the allowances in SR 3.0.1 and the associated actions provide adequate guidance with respect to when the associated surveillances are required to be performed and this explicit requirement is not retained. This change is consistent with NUREG-1433, Revision 1.

A6 CTS Table 4.1-1 Note 4 and RETS Table 3.10-2 Note (i), specify that the instrumentation channels are excepted from the instrumentation channel test definition. The instrumentation channel functional test will consist of injecting a simulated electrical signal into the instrument channels. This explicit allowance is not retained in ITS 3.3.6.2 since it is duplicative of the current and proposed CHANNEL FUNCTIONAL TEST definition in ITS Chapter 1.0. Since this change does not change any technical requirements, it is considered administrative. This change is consistent with NUREG-1433, Revision 1.

A7 Note 9 of Tables 4.2-1 through 4.2-5 and CTS RETS Table 3.10-2 Note (h) have been deleted. These Notes state that the logic system functional tests shall include a calibration of time delay relays and timers necessary for proper functioning of the trip systems. Since the secondary containment isolation Functions do not include any time delay relays, this Note does not apply and its deletion is considered administrative. | J

A8 The quarterly Instrument Channel Functional Test required in CTS RETS Table 3.10-2 for the Refuel Area Exhaust and the Reactor Building Area Exhaust Monitors has been deleted since it is a duplication of the testing performed in accordance with the current and proposed quarterly Channel Calibration (ITS SR 3.3.6.2.3). Since the proposed Calibration will perform the same testing that is currently performed this change is considered administrative. This change is consistent with the format of NUREG-1433, Revision 1.

A9 The requirement in CTS Table 3.2-1 Note 1, "there shall be two operable or tripped trip systems for each Trip Function, except as provided below" has been deleted. The current requirements in CTS Table 3.2-1 Notes provide sufficient guidance to take when channels are inoperable. The ITS 3.3.6.2 LCO, the requirements in proposed Table 3.3.6.2-1, and the ACTIONS clearly define the appropriate requirements when channels are inoperable in the ITS. Since there is no technical change in deleting this portion of the Note, this change is considered administrative.

Table 3.3.6.2-1 (page 1 of 1)
Secondary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level — Low Low, (Level 2)	1,2,3, [(a)]	[2]	SR 3.3.6.2.1 SR 3.3.6.2.2 [SR 3.3.6.2.3] SR 3.3.6.2.5 SR 3.3.6.2.6 SR 3.3.6.2.7	≥ [-47] inches
2. Drywell Pressure — High	1,2,3	[2]	SR 3.3.6.2.1 SR 3.3.6.2.2 [SR 3.3.6.2.3] SR 3.3.6.2.5 SR 3.3.6.2.6 SR 3.3.6.2.7	≤ [1.92] psig
3. Reactor Building Exhaust Radiation — High	1,2,3, [(a), (b)]	[2]	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.5 SR 3.3.6.2.6 SR 3.3.6.2.7	≤ [60] mR/hr
4. Refueling Floor Exhaust Radiation — High	1,2,3, [(a), (b)]	[2]	SR 3.3.6.2.1 SR 3.3.6.2.2 [SR 3.3.6.2.4] SR 3.3.6.2.6 SR 3.3.6.2.7	≤ [20] mR/hr
5. Manual Initiation	1,2,3, [(a), (b)]	[1 per group]	SR 3.3.6.2.6	NA

(a) During operations with a potential for draining the reactor vessel.

(b) During [CORE ALTERATIONS and during] movement of irradiated fuel assemblies in [secondary] containment.

Revision J

B 3.3 INSTRUMENTATION

B 3.3.6.2 Secondary Containment Isolation Instrumentation

BASES

BACKGROUND

The secondary containment isolation instrumentation automatically initiates closure of appropriate secondary containment isolation valves (SCIVs) and starts the Standby Gas Treatment (SGT) System. The function of these systems, in combination with other accident mitigation systems, is to limit fission product release during and following postulated Design Basis Accidents (DBAs) (Ref. 1). Secondary containment isolation and establishment of vacuum with the SGT System within the assumed time limits ensures that fission products that leak from primary containment following a DBA, or are released outside primary containment, or are released during certain operations when primary containment is not required to be OPERABLE are maintained within applicable limits.

The isolation instrumentation includes the sensors, relays, and switches that are necessary to cause initiation of secondary containment isolation. Most channels include electronic equipment (e.g., trip units) that compares measured input signals with pre-established setpoints. When the setpoint is exceeded, the channel output relay actuates, which then outputs a secondary containment isolation signal to the isolation logic. Functional diversity is provided by monitoring a wide range of independent parameters. The input parameters to the isolation logic are (1) reactor vessel water level, (2) drywell pressure, (3) reactor building exhaust, and (4) refueling floor exhaust high radiation. Redundant sensor input signals from each parameter are provided for initiation of isolation. In addition, manual initiation of the logic is provided.

The outputs of the logic channels in a trip system are arranged into two one-out-of-two trip system logics. One trip system initiates isolation of one automatic isolation valve (damper) and starts one SGT subsystem while the other trip system initiates isolation of the other automatic isolation valve in the penetration and starts the other SGT subsystem. Each logic closes one of the two valves on each penetration and starts one SGT subsystem, so that operation of either logic isolates the secondary containment and provides for the necessary filtration of fission products.

(continued)

DB 1 INSERT BKGD-1

, trips the refuel floor exhaust fans, trips the tank and equipment drain sump exhaust fan, and places the reactor building ventilation system in the recirculation mode of operation. J

DB 1 INSERT BKGD-2

The outputs of the logic channels for reactor building ventilation exhaust and refueling ventilation exhaust radiation are arranged into two one-out-of-one trip system logics.

BASES (continued) and control room DB1

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The isolation signals generated by the secondary containment isolation instrumentation are implicitly assumed in the safety analyses of References 1 and 2 to initiate closure of valves and start the SGT System to limit offsite doses.

Refer to LCO 3.6.4.2, "Secondary Containment Isolation Valves (SCIVs)," and LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," Applicable Safety Analyses Bases for more detail of the safety analyses.

10 CFR 50.36(c)(2)(ii) (Ref. 3) X1

The secondary containment isolation instrumentation satisfies Criterion 3 of ~~the NRC Policy Statement~~. Certain instrumentation Functions are retained for other reasons and are described below in the individual Functions discussion. DB1 J

The OPERABILITY of the secondary containment isolation instrumentation is dependent on the OPERABILITY of the individual instrumentation channel Functions. Each Function must have the required number of OPERABLE channels with their setpoints set within the specified Allowable Values, as shown in Table 3.3.6.2-1. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. Each channel must also respond within its assumed response time, where appropriate. CLB1

Allowable Values are specified for each Function specified in the Table. Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the setpoints do not exceed the Allowable Value between CHANNEL CALIBRATIONS. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable.

Trip setpoints are those predetermined values of output at which an action should take place. The setpoints are compared to the actual process parameter (e.g., reactor vessel water level), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., trip unit) changes state. The analytic limits are derived from the limiting values of the process parameters obtained from the safety analysis. The Allowable Values are derived from the analytic limits, corrected for calibration, process, and some of the instrument errors. The trip setpoints are then determined accounting for the DB3

Insert ASA

(continued)

Revision J

DB3

INSERT ASA

The trip setpoints are derived from the analytical limits and account for all worst case instrumentation uncertainties as appropriate (e.g., drift, process effects, calibration uncertainties, and severe environmental errors (for channels that must function in harsh environments as defined by 10 CFR 50.49)). The trip setpoints derived in this manner provide adequate protection because all expected uncertainties are accounted for. The Allowable Values are then derived from the trip setpoints by accounting for normal effects that would be seen during periodic surveillance or calibration. These effects are instrumentation uncertainties observed during normal operation (e.g., drift and calibration uncertainties). J

DB1 Insert Function 1

The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Rev. 8).

PA3

BASES (continued)

ACTIONS

[Reviewer's Note: Certain LCO Completion Times are based on approved topical reports. In order for a licensee to use the times, the licensee must justify the Completion Times as required by the staff Safety Evaluation Report (SER) for the topical report.]

A Note has been provided to modify the ACTIONS related to secondary containment isolation instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable secondary containment isolation instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable secondary containment isolation instrumentation channel.

A.1

(which have components common to RPS) DB4 5

Because of the diversity of sensors available to provide isolation signals and the redundancy of the isolation design, an allowable out of service time of 12 hours for Functions 1 and 2, and 24 hours for Functions ~~other than Function 2~~ 3 and 4, has been shown to be acceptable (Refs. 6 and 7) to permit restoration of any inoperable channel to OPERABLE status. This out of service time is only acceptable provided the associated Function is still maintaining isolation capability (refer to Required Action B.1 Bases). If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action A.1. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an isolation), Condition C must be entered and its Required Actions taken.

DB5

(continued)

Revision J

JA1

INSERT SR 3.3.6.2.2

A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. 1T

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.2.6 (continued)

Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency.

SR 3.3.6.2.7

This SR ensures that the individual channel response times are less than or equal to the maximum value assumed in the accident analysis. Testing is performed only on channels where the assumed response time does not correspond to the diesel generator (DG) start time. For channels assumed to respond within the DG start time, sufficient margin exists in the [10] second start time when compared to the typical channel response time (milliseconds) so as to assure adequate response without a specific measurement test. The instrument response times must be added to the SCIV closure times to obtain the ISOLATION SYSTEM RESPONSE TIME. ISOLATION SYSTEM RESPONSE TIME acceptance criteria are included in Reference 7.

A Note to the Surveillance states that the radiation detectors may be excluded from ISOLATION SYSTEM RESPONSE TIME testing. This Note is necessary because of the difficulty of generating an appropriate detector input signal and because the principles of detector operation virtually ensure an instantaneous response time. Response time for radiation detector channels shall be measured from detector output or the input of the first electronic component in the channel.

ISOLATION SYSTEM RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS. The 18 month Frequency is consistent with the typical industry refueling cycle and is based on plant operating experience, which shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent occurrences.

REFERENCES

1. FSAR, Section [6.3].

2. FSAR, Chapter [15].

(continued)

BASES

REFERENCES (continued)

3. FSAR, Section [15.2.40].

4. FSAR, Sections [15.1.39 and 15.1.41].

5. NEDC-31677P-A, "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation," July 1990.

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

7. FSAR, Section [7.3].

8. Drawing 11825-5.01-15D, Rev. D, Reactor Assembly Nuclear Boiler, (GE Drawing 919D690BD).

Revision J

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.6.2.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.6.2.3	Perform CHANNEL CALIBRATION	92 days
SR 3.3.6.2.4	Calibrate the trip units.	184 days
SR 3.3.6.2.5	Perform CHANNEL CALIBRATION.	24 months
SR 3.3.6.2.6	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

B 3.3 INSTRUMENTATION

B 3.3.6.2 Secondary Containment Isolation Instrumentation

BASES

BACKGROUND

The secondary containment isolation instrumentation automatically initiates closure of appropriate secondary containment isolation valves (SCIVs), trips the refuel floor exhaust fans, trips the tank and equipment drain sump exhaust fan, and places the reactor building ventilation system in the recirculation mode of operation and starts the Standby Gas Treatment (SGT) System. The function of these systems, in combination with other accident mitigation systems, is to limit fission product release during and following postulated Design Basis Accidents (DBAs) (Ref. 1). Secondary containment isolation and establishment of vacuum with the SGT System within the required time limits ensures that fission products that leak from primary containment following a DBA, or are released outside primary containment, or are released during certain operations when primary containment is not required to be OPERABLE are maintained within applicable limits.

The isolation instrumentation includes the sensors, logic circuits, relays, and switches that are necessary to cause initiation of secondary containment isolation. Most channels include electronic equipment (e.g., trip units) that compares measured input signals with pre-established setpoints. When the setpoint is exceeded, the channel output relay actuates, which then outputs a secondary containment isolation signal to the isolation logic. Functional diversity is provided by monitoring a wide range of independent parameters. The input parameters to the isolation logic are (1) reactor vessel water level, (2) drywell pressure, (3) reactor building ventilation exhaust radiation, and (4) refueling floor ventilation exhaust radiation. Redundant sensor input signals from each parameter are provided for initiation of isolation.

The outputs of the logic channels for reactor water level and drywell pressure are arranged into two two-out-of-two trip system logics. The outputs of the logic channels for reactor building ventilation exhaust and refueling ventilation exhaust radiation are arranged into two one-out-of-one trip system logics. One trip system initiates isolation of one automatic isolation valve (damper)

(continued)

BASES

BACKGROUND (continued)

and starts one SGT subsystem while the other trip system initiates isolation of the other automatic isolation valve in the penetration and starts the other SGT subsystem. Each logic closes one of the two valves on each penetration and starts one SGT subsystem, so that operation of either logic isolates the secondary containment and provides for the necessary filtration of fission products.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The isolation signals generated by the secondary containment isolation instrumentation are implicitly assumed in the safety analyses of References 1 and 2 to initiate closure of valves and start the SGT System to limit offsite and control room doses.

Refer to LCO 3.6.4.2, "Secondary Containment Isolation Valves (SCIVs)," and LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," Applicable Safety Analyses Bases for more detail of the safety analyses.

The secondary containment isolation instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 3).

The OPERABILITY of the secondary containment isolation instrumentation is dependent on the OPERABILITY of the individual instrumentation channel Functions. Each Function must have the required number of OPERABLE channels with their setpoints set within the specified Allowable Values, as shown in Table 3.3.6.2-1. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

Allowable Values are specified for each Function specified in the Table. Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the setpoints do not exceed the Allowable Value between CHANNEL CALIBRATIONS. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1. Reactor Vessel Water Level - Low (Level 3) (continued)

Reactor Vessel Water Level - Low (Level 3) signals are initiated from level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels of Reactor Vessel Water Level - Low (Level 3) Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Reactor Vessel Water Level - Low (Level 3) Allowable Value was chosen to be the same as the RPS level scram Allowable Value (LCO 3.3.1.1, "Reactor Protection System Instrumentation"), since this could indicate that the capability to cool the fuel is being threatened. The Allowable Value is referenced from a level of water 352.56 inches above the lowest point in the inside bottom of the RPV and also corresponds to the top of a 144 inch fuel column (Ref. 8).

The Reactor Vessel Water Level - Low (Level 3) Function is required to be OPERABLE in MODES 1, 2, and 3 where considerable energy exists in the Reactor Coolant System (RCS); thus, there is a probability of pipe breaks resulting in significant releases of radioactive steam and gas. In MODES 4 and 5, the probability and consequences of these events are low due to the RCS pressure and temperature limitations of these MODES; thus, this Function is not required. In addition, the Function is also required to be OPERABLE during operations with a potential for draining the reactor vessel (OPDRVs) because the capability of isolating potential sources of leakage must be provided to ensure that offsite and control room dose limits are not exceeded if core damage occurs.

2. Drywell Pressure - High

High drywell pressure can indicate a break in the reactor coolant pressure boundary (RCPB). An isolation of the secondary containment and actuation of the SGT System are initiated in order to minimize the potential of an offsite and control room release. The Drywell Pressure - High

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3, 4. Reactor Building and Refueling Floor Ventilation Exhaust Radiation - High (continued)

exhaust piping coming from the reactor building and the refueling floor zones. The signal from each detector is input to an individual monitor whose trip outputs are assigned to an isolation channel. Two channels of Reactor Building Ventilation Exhaust Radiation - High Function and two channels of Refueling Floor Ventilation Exhaust Radiation - High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Values are chosen to promptly detect gross failure of the fuel cladding and are set in accordance with the ODCM.

The Reactor Building and Refueling Floor Ventilation Exhaust Radiation - High Functions are required to be OPERABLE in MODES 1, 2, and 3 where considerable RCS energy exists; thus, there is a probability of pipe breaks resulting in significant releases of radioactive steam and gas. In MODES 4 and 5, the probability and consequences of these events are low due to the RCS pressure and temperature limitations of these MODES; thus, these Functions are not required. In addition, the Functions are also required to be OPERABLE during CORE ALTERATIONS, OPDRVs, and movement of irradiated fuel assemblies in the secondary containment, because the capability of detecting radiation releases due to fuel failures (due to fuel uncovery or dropped fuel assemblies) must be provided to ensure that offsite and control room dose limits are not exceeded.

ACTIONS

A Note has been provided to modify the ACTIONS related to secondary containment isolation instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable secondary containment isolation instrumentation channels

(continued)

BASES

ACTIONS (continued)

provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable secondary containment isolation instrumentation channel.

A.1

Because of the diversity of sensors available to provide isolation signals and the redundancy of the isolation design, an allowable out of service time of 12 hours for Functions 1 and 2 (which have components common to RPS), and 24 hours for Functions 3 and 4, has been shown to be acceptable (Refs. 6 and 7) to permit restoration of any inoperable channel to OPERABLE status. This out of service time is only acceptable provided the associated Function is still maintaining isolation capability (refer to Required Action B.1 Bases). If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action A.1. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an isolation), Condition C must be entered and its Required Actions taken.

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in a loss of isolation capability for the associated penetration flow path(s) or a loss of initiation capability for the SGT System. A Function is considered to be maintaining secondary containment isolation capability when sufficient channels are OPERABLE or in trip, such that one trip system will generate a trip signal from the given Function on a valid signal. This ensures that one of the two SCIVs in the associated penetration flow path and one SGT subsystem can be initiated on an isolation signal from the given Function. For the Functions with two two-out-of-two logic trip systems (Functions 1 and 2), this would require one trip system to

(continued)

BASES

ACTIONS

B.1 (continued)

have both channels OPERABLE or in trip. For Functions 3 and 4, this would require one trip system to have one OPERABLE or tripped channel.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

C.1.1, C.1.2, C.2.1, and C.2.2

If any Required Action and associated Completion Time of Condition A or B are not met, the ability to isolate the secondary containment and start the SGT System cannot be ensured. Therefore, further actions must be performed to ensure the ability to maintain the secondary containment function. Isolating the associated secondary containment penetration flow path(s) (closing the ventilation supply and exhaust automatic isolation dampers) and starting the associated SGT subsystem (Required Actions C.1.1 and C.2.1) performs the intended function of the instrumentation and allows operation to continue.

Alternately, declaring the associated SCIVs or SGT subsystem(s) inoperable (Required Actions C.1.2 and C.2.2) is also acceptable since the Required Actions of the respective LCOs (LCO 3.6.4.2 and LCO 3.6.4.3) provide appropriate actions for the inoperable components.

One hour is sufficient for plant operations personnel to establish required plant conditions or to declare the associated components inoperable without unnecessarily challenging plant systems.

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs for each Secondary Containment Isolation instrumentation Function are located in the SRs column of Table 3.3.6.2-1.

The Surveillances are modified by a Note to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains secondary containment isolation capability. Upon completion of the Surveillance, or expiration of the 6 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken. This Note is based on the reliability analysis (Refs. 6 and 7) assumption of the average time required to perform channel surveillance. That analysis demonstrated the 6 hour testing allowance does not significantly reduce the probability that the SCIVs will isolate the associated penetration flow paths and that the SGT System will initiate when necessary.

SR 3.3.6.2.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the instrument channels could be an indication of excessive instrument drift in one of the channels or something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Channel agreement criteria are determined by the plant staff based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the instrument has drifted outside its limit.

The Frequency is based on operating experience that demonstrates channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channel status during normal operational use of the displays associated with channels required by the LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.2.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of References 6 and 7.

SR 3.3.6.2.3 and SR 3.3.6.2.5

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequencies of SR 3.3.6.2.3 and SR 3.3.6.2.5 are based on the assumption of a 92 day and a 24 month calibration interval, respectively, in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.6.2.4

Calibration of trip units provides a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in Table 3.3.6.2-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.2.4 (continued)

is not beyond the Allowable Value, performance is still within the requirements of the plant safety analysis. Under these conditions, the setpoint must be readjusted to be equal to or more conservative than accounted for in the appropriate setpoint methodology.

The Frequency of 184 days is based on the reliability, accuracy and lower failure rates of the solid-state electronic Analog Transmitters/Trip System components.

SR 3.3.6.2.6

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required isolation logic for a specific channel. The system functional testing performed on SCIVs and the SGT System in LCO 3.6.4.2 and LCO 3.6.4.3, respectively, overlaps this Surveillance to provide complete testing of the assumed safety function.

While this Surveillance can be performed with the reactor at power for some Functions, the 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 24 month Frequency.

REFERENCES

1. UFSAR, Section 5.3.
2. UFSAR, Chapter 14.
3. 10 CFR 50.36(c)(2)(ii).
4. UFSAR, Section 14.6.1.3.
5. UFSAR, Section 14.6.1.4.
6. NEDC-31677P-A, Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation, July 1990.

(continued)

BASES

REFERENCES (continued)

7. NEDC-30851P-A, Supplement 2, Technical Specifications Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation, March 1989.

8. Drawing 11825-5.01-15D, Rev. D, Reactor Assembly Nuclear Boiler, (GE Drawing 919D690BD).

J

INSERT APPL (0.B.1)

MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS,
During operations with a potential for draining the reactor vessel.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 Declare associated [MCREC] subsystem inoperable.	1 hour

SURVEILLANCE REQUIREMENTS

NOTES

1. Refer to Table 3.3.7.1-1 to determine which SRs apply for each [MCREC] Function.
2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains [MCREC] initiation capability.

SURVEILLANCE	FREQUENCY
SR 3.3.7.1.1 Perform CHANNEL CHECK.	12 hours
SR 3.3.7.1.2 Perform CHANNEL FUNCTIONAL TEST.	[92] days
SR 3.3.7.1.3 Calibrate the trip units.	[92] days
SR 3.3.7.1.4 Perform CHANNEL CALIBRATION. The Allowable Value shall be ≤ 4000 cpm.	[18] months 92 days
SR 3.3.7.1.5 Perform LOGIC SYSTEM FUNCTIONAL TEST.	[18] months

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BASES (continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The ability of the MCREC System to maintain the habitability of the MCR is explicitly assumed for certain accidents as discussed in the FSAR safety analyses (Refs. 2, 3, and 4). MCREC System operation ensures that the radiation exposure of control room personnel, through the duration of any one of the postulated accidents, does not exceed the limits set by GDC 19 of 10 CFR 50, Appendix A.

MCREC System instrumentation satisfies Criterion 3 of the NRC Policy Statement.

The OPERABILITY of the MCREC System instrumentation is dependent upon the OPERABILITY of the individual instrumentation channel Functions specified in Table 3.3.7.1-1. Each Function must have a required number of OPERABLE channels, with their setpoints within the specified Allowable Values, where appropriate. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions.

Allowable Values are specified for each MCREC System Function specified in the Table. Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the setpoints do not exceed the Allowable Value between successive CHANNEL CALIBRATIONS. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable. Trip setpoints are those predetermined values of output at which an action should take place. The setpoints are compared to the actual process parameter (e.g., reactor vessel water level), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., trip unit) changes state. The analytic limits are derived from the limiting values of the process parameters obtained from the safety analysis. The Allowable Values are derived from the analytic limits, corrected for calibration, process, and some of the instrument errors. The trip setpoints are then determined accounting for the remaining instrument errors (e.g., drift). The trip setpoints derived in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, instrument drift, and severe environment errors (for channels that must function in harsh environments as defined by 10 CFR 50.49) are accounted for.

PA1; control room; CREVAS; and further discussed in Reference 5; DB5; 10 CFR 50.36(c)(2)(ii) (Ref. 6); X1; J; PA3; DB2; Control Room Air Inlet Radiation-High Function. This; one; its; The; An; is; A; the Control Room Air Inlet Radiation-High; in SR 3.3.7.1.2; control room air inlet radiation; output relay; DB4; DB6; Insert ASA; The Allowable Value was selected to ensure protection of the control room personnel; moved from page B 3.3-212

(continued)

Revision J

(DB6)

INSERT ASA

The trip setpoint is derived from the analytical limit and accounts for all worst case instrumentation uncertainties as appropriate (e.g., drift, process effects, calibration uncertainties, and severe environmental errors (for channels that must function in harsh environments as defined by 10 CFR 50.49)). The trip setpoint derived in this manner provides adequate protection because all expected uncertainties are accounted for. The Allowable Values are then derived from the trip setpoints by accounting for normal effects that would be seen during periodic surveillance or calibration. These effects are instrumentation uncertainties observed during normal operation (e.g., drift and calibration uncertainties).

PA1

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

PA3

3. Main Steam Line Flow—High (continued)

The Main Steam Line Flow—High Function is required to be OPERABLE in MODES 1, 2, and 3 to ensure that control room personnel are protected during a main steam line break (MSLB) accident. In MODES 4 and 5, the reactor is depressurized; thus, MSLB protection is not required.

4. Refueling Floor Area Radiation—High

High radiation in the refueling floor area could be the result of a fuel handling accident. A refueling floor high radiation signal will automatically initiate the MCREC System, since this radiation release could result in radiation exposure to control room personnel.

The refueling floor area radiation equipment consists of two independent monitors and channels located in the refueling floor area. Two channels of Refueling Floor Area Radiation—High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude MCREC System initiation. The Allowable Value was selected to ensure that the Function will promptly detect high activity that could threaten exposure to control room personnel.

The Refueling Floor Area Radiation—High Function is required to be OPERABLE in MODES 1, 2, and 3 and during movement of irradiated fuel assemblies in the secondary containment, CORE ALTERATIONS, and operations with a potential for draining the reactor vessel (OPDRVs), to ensure that control room personnel are protected during a LOCA, fuel handling event, or vessel draindown event. During MODES 4 and 5, when these specified conditions are not in progress (e.g., CORE ALTERATIONS), the probability of a LOCA or fuel damage is low; thus, the Function is not required.

J

DB2

5. Control Room Air Inlet Radiation—High

DB2

The control room air inlet (in) radiation monitor(s) measure radiation levels ~~exterior to~~ the inlet ducting of the ~~MCR~~. A high radiation level may pose a threat to ~~MCR~~ (control room) personnel; thus, ~~automatically initiating the MCREC System~~ an alarm is provided in the control room so that the CREVAS System can be placed in the isolate mode of operation.

DB2 PA1

(continued)

DB1

Revision J

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued) PA3

5. Control Room Air Inlet Radiation—High (continued) DB2

J

The Control Room Air Inlet Radiation—High Function consists of two independent monitors. Two channels of Control Room Air Inlet Radiation—High are available and are required to be OPERABLE to ensure that no single instrument failure can preclude MCREC System initiation. The Allowable Value was selected to ensure protection of the control room personnel.

Move to page B 3.3-208 PA3

The Control Room Air Inlet Radiation—High Function is required to be OPERABLE in MODES 1, 2, and 3 and during CORE ALTERATIONS, OPDRVs, and movement of irradiated fuel assemblies in the secondary containment, to ensure that control room personnel are protected during a LOCA, fuel handling event, or vessel draindown event. During MODES 4 and 5, when these specified conditions are not in progress (e.g., CORE ALTERATIONS), the probability of a LOCA or fuel damage is low; thus, the Function is not required.

ACTIONS

PA4

[Reviewer's Note: Certain LCO Completion Times are based on approved topical reports. In order for a licensee to use the times, the licensee must justify the Completion Times as required by the staff Safety Evaluation Report (SER) for the topical report.]

DB2

A Note has been provided to modify the ACTIONS related to MCREC System instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable MCREC System instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable MCREC System instrumentation channel.

(continued)

Revision J

BASES

ACTIONS

C.1 and C.2 (continued)

The 6 hour Completion Time is based on the consideration that this Function provides the primary signal to start the MCREC System; thus, ensuring that the design basis of the MCREC System is met.

D.1, D.2, and D.3

With any Required Action and associated Completion Time not met, the associated MCREC subsystem(s) must be placed in the pressurization mode of operation per Required Action D.1 to ensure that control room personnel will be protected in the event of a Design Basis Accident. The method used to place the MCREC subsystem(s) in operation must provide for automatically re-initiating the subsystem(s) upon restoration of power following a loss of power to the MCREC subsystem(s). As noted, if the toxic gas protection instrumentation is concurrently inoperable, then the MCREC subsystem(s) should be placed in the toxic gas mode instead of the pressurization mode. This provides proper protection of the control room personnel if both toxic gas instrumentation (not required by Technical Specifications) and radiation instrumentation are concurrently inoperable. Alternately, if a Function 3 channel is inoperable and untripped, the associated MSL may be isolated, since isolating the MSL performs the intended function of the MCREC System instrumentation. Alternately, if it is not desired to start the subsystem(s) or isolate the MSL, the MCREC subsystem(s) associated with inoperable, untripped channels must be declared inoperable within 1 hour.

The 1 hour Completion Time is intended to allow the operator time to place the MCREC subsystem(s) in operation or to isolate the associated MSLs if applicable. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration or tripping of channels, for placing the associated MCREC subsystem(s) in operation, for isolating the associated MSLs, or for entering the applicable Conditions and Required Actions for the inoperable MCREC subsystem(s).

(continued)

SURVEILLANCE REQUIREMENTS

NOTE

When the channel is placed in an inoperable status solely for performance of required Surveillances, entry into the Condition and Required Actions may be delayed for up to 6 hours.

SURVEILLANCE		FREQUENCY
SR 3.3.7.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.7.1.2	Perform CHANNEL CALIBRATION. The Allowable Value shall be ≤ 4000 cpm.	92 days

B 3.3 INSTRUMENTATION

B 3.3.7.1 Control Room Emergency Ventilation Air Supply (CREVAS) System Instrumentation

BASES

BACKGROUND

The CREVAS System is designed to provide a radiologically controlled environment to ensure the habitability of the control room for the safety of control room operators under all plant conditions. Two independent CREVAS subsystems are each capable of fulfilling the stated safety function. The instrumentation for the CREVAS System provides an alarm so that manual action can be taken to place the CREVAS System in the isolate mode of operation to pressurize the control room to minimize the infiltration of radioactive material into the control room environment.

In the event of a Control Room Air Inlet Radiation—High signal, the CREVAS System is manually started in the isolate mode. Air is then drawn in from the air intake source and passes through one of two special filter trains each consisting of a prefilter, a high efficiency (HEPA) filter, two charcoal filters and a second HEPA filter. This air is then combined with recirculated air and directed to one of two control room ventilation fans and directed to the control room to maintain the control room slightly pressurized with respect to the adjacent areas.

The CREVAS System instrumentation consists of a single trip system with one Control Room Air Inlet Radiation—High channel. The channel includes electronic equipment (e.g., detector, monitor and trip relay) that compares measured input signals with pre-established setpoints. When the setpoint is exceeded, the channel output relay actuates, which then outputs to an alarm in the control room.

APPLICABLE SAFETY ANALYSES

The ability of the CREVAS System to maintain the habitability of the control room is explicitly assumed for certain accidents as discussed in the UFSAR safety analyses (Refs. 1, 2, 3, and 4) and further discussed in Reference 5. CREVAS System operation ensures that the radiation exposure of control room personnel, through the duration of any one of the postulated accidents, does not exceed the limits set by GDC 19 of 10 CFR 50, Appendix A. |J

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

CREVAS System instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 6).

LCO

The OPERABILITY of the CREVAS System instrumentation is dependent upon the OPERABILITY of the Control Room Air Inlet Radiation—High Function. This Function must have one OPERABLE channel, with its setpoint within the specified Allowable Value. The channel is inoperable if its actual trip setpoint is not within its required Allowable Value. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions.

An Allowable Value is specified for the Control Room Air Inlet Radiation—High Function in SR 3.3.7.1.2. A nominal trip setpoint is specified in the setpoint calculation. The nominal setpoint is selected to ensure that the setpoint does not exceed the Allowable Value between successive CHANNEL CALIBRATIONS. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable. Trip setpoints are those predetermined values of output at which an action should take place. The setpoints are compared to the actual process parameter (e.g., control room air inlet radiation), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., output relay) changes state. The analytic limit is derived from the limiting value of the process parameters obtained from the safety analysis. The trip setpoint is derived from the analytical limit and accounts for all worst case instrumentation uncertainties as appropriate (e.g., drift, process effects, calibration uncertainties, and severe environmental errors (for channels that must function in harsh environments as defined by 10 CFR 50.49)). The trip setpoint derived in this manner provides adequate protection because all expected uncertainties are accounted for. The Allowable Value is then derived from the trip setpoint by accounting for normal effects that would be seen during periodic surveillance or calibration. These effects are instrumentation uncertainties observed during normal operation (e.g., drift and calibration uncertainties). The Allowable Value was selected to ensure protection of the control room personnel.

The control room air inlet radiation monitor measures radiation levels in the inlet ducting of the control room.

(continued)

BASES

LCO (continued)

A high radiation level may pose a threat to control room personnel; thus, an alarm is provided in the control room so that the CREVAS System can be placed in the isolate mode of operation.

APPLICABILITY

The Control Room Air Inlet Radiation - High Function is required to be OPERABLE in MODES 1, 2, and 3 and during CORE ALTERATIONS, OPDRVs, and movement of irradiated fuel assemblies in the secondary containment, to ensure that control room personnel are protected during a LOCA, fuel handling event, or vessel draindown event. During MODES 4 and 5, when these specified conditions are not in progress (e.g., CORE ALTERATIONS), the probability of a LOCA or fuel damage is low; thus, the Function is not required.

ACTIONS

A.1 and A.2

With the Control Room Air Inlet Radiation - High Function inoperable one CREVAS subsystem must be placed in the isolate mode of operation per Required Action A.1 to ensure that control room personnel will be protected in the event of a Design Basis Accident. Alternately, if it is not desired to start a CREVAS subsystem, the CREVAS System must be declared inoperable within 1 hour.

The 1 hour Completion Time is intended to allow the operator time to place the CREVAS subsystem in operation. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration of the channel, for placing one CREVAS subsystem in operation, or for entering the applicable Conditions and Required Actions for two inoperable CREVAS subsystems.

SURVEILLANCE REQUIREMENTS

The Surveillances are modified by a Note to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours. Upon completion of the Surveillance, or expiration

(continued)

< INSERT Page 3.3-71a > DB1

3.3 INSTRUMENTATION

3.3.7.~~8~~ 2 Condenser Air Removal ~~Vacuum~~ Pump Isolation Instrumentation

[T. 3.2-1 RETS T. 3.10.-1] [RETS 3.9.a]

LCO 3.3.7.~~8~~ 2 Four channels of the Main Steam Line ~~Tunnel~~ Radiation—High Function for the condenser air removal ~~vacuum~~ pump isolation shall be OPERABLE.

[RETS 3.9.a] [L1] [Table 3.2-1 Note 1]

APPLICABILITY: MODES 1 and 2 with any ~~the~~ condenser air removal ~~vacuum~~ pump not isolated and any main steam line not isolated ~~in service~~.

ACTIONS

[A5]

-----NOTE-----
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more ~~required~~ channels inoperable.	A.1 Restore channel to OPERABLE status.	~~[~~24 hours~~]~~
	OR	
[TABLE 3.2-1 Note 1.a Note 1.a.2 Note 1.b.3] [A12]	A.2 -----NOTE----- Not applicable if inoperable channel is the result of an inoperable isolation valve. ----- Place channel or associated trip system in trip.	~~[~~24 hours~~]~~
B. Condenser air removal pump isolation capability not maintained. [Table 3.2-1 Note 1.b.1]	B.1 Restore isolation capability.	1 hour

(continued)

[3]

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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
[Table 3.2-1 Note 1.a, 1.b Note 3.E] [RETS 3.9.a] [L1] C. B. Required Action and associated Completion Time of Condition A or B not met. OR Condenser vacuum pump isolation capability not maintained.	C.1 B.1 Isolate the condenser vacuum pump. air removal (3)	12 hours
	OR	
	C.2 B.2 Isolate the main steam lines.	12 hours
	OR	
	C.3 B.3 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

[Table 3.2-1 Note 2.b]

-----------------------------------NOTE-----------------------------------
When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains condenser vacuum pump isolation capability. air removal
----

SURVEILLANCE	FREQUENCY
[Table 4.2-1] SR 3.3.7.8.1 (2) Perform CHANNEL CHECK.	12 hours
[Table 4.2-1] [RETS Table 3.10-1] [RETS Table 3.2-1] SR 3.3.7.8.2 (2) Perform CHANNEL FUNCTIONAL TEST. CALIBRATION INSERT SR 3.3.7.2.2 NOTE	[92] days INSERT SR 3.3.7.2.2
[SR 3.3.7.X.3 Calibrate the trip units.]	[92] days]
[Table 4.2-1] SR 3.3.7.8.4 (2) (3) Perform CHANNEL CALIBRATION. The allowable value shall be ≤ 10 x normal background. Calibrate the radiation detectors.	[18] months 24

(continued)

J

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<Insert Page 3.3-74c> DB1

INSERT SR 3.3.7.2.2 Note

1 J

------------------NOTE---------------
Radiation detectors are excluded.

INSERT SR 3.3.7.2.2

The Allowable Value shall be ≤ 3 times Normal Full Power Background.

<Insert Page B3.3-219b> DB1

BASES (continued)

APPLICABLE SAFETY ANALYSES

The condenser vacuum pump isolation is assumed in the safety analysis for the CRDA. The condenser vacuum pump isolation instrumentation initiates an isolation of the condenser vacuum pump to limit offsite doses resulting from fuel cladding failure in a CRDA (Ref. 2).

The condenser vacuum pump isolation satisfies Criterion 3 of the NRC Policy Statement.

LCO

The OPERABILITY of the condenser vacuum pump isolation is dependent on the OPERABILITY of the individual Main Steam Tunnel Radiation-High instrumentation channels, which must have a required number of OPERABLE channels in each trip system, with their setpoints within the specified Allowable Value of SR 3.3.7.0.4. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. Channel OPERABILITY also includes the associated isolation valve.

Allowable Values are specified for the condenser vacuum pump isolation Function specified in the LCO. Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the setpoints do not exceed the Allowable Value between CHANNEL CALIBRATIONS. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable. Trip setpoints are those predetermined values of output at which an action should take place. The setpoints are compared to the actual process parameter (i.e., Main Steam Tunnel Radiation-High), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., trip unit) changes state. The analytic limits are derived from the limiting values of the process parameters obtained from the safety analysis. The Allowable Values are derived from the analytic limits, corrected for calibration, process, and some of the instrument errors. The trip setpoints are then determined accounting for the remaining instrument errors (e.g., drift). The trip setpoints derived in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, instrument drift, and severe environment errors (for channels that must function in harsh environments as defined by 10 CFR 50.49) are accounted for.

(continued)

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DBI — <Insert Page B 3.3-219 k>

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.7.2.4 (continued)

The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at the 24 month Frequency.

REFERENCES

1. UFSAR, Section 10.4.3.1.
2. UFSAR, Section 14.6.1.2.
3. ~~[NEDE-770-06-1, "Bases for Changes To Surveillance Test Intervals and Allowed Out-of-Service Times For Selected Instrumentation Technical Specifications," February 1991.]~~
3. 10 CFR 50.36 (c)(2)(ii).
4. NEDC-31677P-A, Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation, July 1990.

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ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Condenser air removal pump isolation capability not maintained.	B.1	Restore isolation capability.	1 hour
C. Required Action and associated Completion Time of Condition A or B not met.	C.1	Isolate the condenser air removal pumps.	12 hours
	<u>OR</u>		
	C.2	Isolate the main steam lines.	12 hours
	<u>OR</u>		
	C.3	Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

-----------------------------------NOTE-----------------------------------
When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains condenser air removal pump isolation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.7.2.1	Perform CHANNEL CHECK.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.7.2.2	-----------------NOTE----------------- Radiation detectors are excluded. -------------------------------------- Perform CHANNEL CALIBRATION. The Allowable Value shall be ≤ 3 times Normal Full Power Background.	92 days
SR 3.3.7.2.3	Calibrate the radiation detectors.	24 months
SR 3.3.7.2.4	Perform LOGIC SYSTEM FUNCTIONAL TEST including isolation valve actuation.	24 months

B 3.3 INSTRUMENTATION

B 3.3.7.2 Condenser Air Removal Pump Isolation Instrumentation

BASES

BACKGROUND

The condenser air removal pump isolation instrumentation initiates an isolation of the suction and discharge valves of the condenser air removal pumps following events in which main steam line radiation exceeds predetermined values. Isolating the condenser air removal pump limits the offsite doses in the event of a control rod drop accident (CRDA).

The condenser air removal pump isolation instrumentation (Ref. 1) includes sensors, logic circuits, relays and switches that are necessary to cause initiation of the condenser air removal pumps isolation. The channels include electronic equipment that compares measured input signals with pre-established setpoints. When the setpoint is exceeded, the channel output relay actuates, which then outputs an isolation signal to the condenser air removal pump isolation logic.

The isolation logic consists of two trip systems, with two channels of Main Steam Line Radiation – High in each trip system. Each trip system is a one-out-of-two logic for this Function. Thus, either channel of Main Steam Line Radiation – High in each trip system are needed to trip a trip system. The outputs of the channels in a trip system are combined in a logic so that both trip systems must trip to result in an isolation signal.

There are two isolation valves associated with this function.

APPLICABLE SAFETY ANALYSES

The condenser air removal pump isolation is assumed in the safety analysis for the CRDA. The condenser air removal pump isolation instrumentation initiates an isolation of the condenser air removal pump to limit offsite doses resulting from fuel cladding failure in a CRDA (Ref. 2).

The condenser air removal pump isolation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 3).

(continued)

BASES

ACTIONS (continued)

C.1, C.2, and C.3

With any Required Action and associated Completion Time of Condition A or B not met, the plant must be brought to a MODE or other specified condition in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours (Required Action C.3). Alternately, the condenser air removal pumps may be isolated since this performs the intended function of the instrumentation (Required Action C.1). An additional option is provided to isolate the main steam lines (Required Action C.2), which may allow operation to continue. Isolating the main steam lines effectively provides an equivalent level of protection by precluding fission product transport to the condenser.

The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions, or to remove the condenser air removal pump from service, or to isolate the main steam lines, in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

The Surveillances are modified by a Note to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into the associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains condenser air removal pump isolation trip capability. Upon completion of the Surveillance, or expiration of the 6 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken. This Note is based on the reliability analysis (Ref. 4) assumption of the average time required to perform channel Surveillance. That analysis demonstrated that the 6 hour testing allowance does not significantly reduce the probability that the condenser air removal pumps will isolate when necessary.

SR 3.3.7.2.1

Performance of the CHANNEL CHECK once every 12 hours ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.7.2.2 and SR 3.3.7.2.3 (continued)

CALIBRATION of the remaining portions of the channel (SR 3.3.6.1.2) are performed using a standard current source.

The Frequency of SR 3.3.7.2.2 is based on the assumption of a 92 day calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis. The Frequency of SR 3.3.7.2.3 is based on the assumption of a 24 month calibration interval in the determination of the magnitude of detector drift in the setpoint analysis.

SR 3.3.7.2.4

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required trip logic for a specific channel. The system functional test of the pump breakers is included as part of this Surveillance and overlaps the LOGIC SYSTEM FUNCTIONAL TEST to provide complete testing of the assumed safety function. Therefore, if a breaker is incapable of operating, the associated instrument channel(s) would be inoperable.

The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed at the 24 month Frequency.

REFERENCES

1. UFSAR, Section 10.4.3.1.
2. UFSAR, Section 14.6.1.2.
3. 10 CFR 50.36(c)(2)(ii).
4. NEDC-31677P-A, Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation, July 1990.

TECHNICAL CHANGES - LESS RESTRICTIVE (SPECIFIC)

L1 (continued)

(e.g., not within Allowable Value) will require entry into CTS LCO 3.0.C and the plant must be in COLD SHUTDOWN within 24 hours. The CTS Actions have been replaced by three ACTIONS in ITS 3.3.7.3 which allows operation to continue with inoperable channels if certain conditions are met. ITS 3.3.7.3 ACTION A, will allow 24 hours to place one or more channels in trip. Placing a channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and thus allow operation to continue. While placing a channel in trip could result in actuation of the logic (if sufficient channels are placed in trip), which further results in operation of the ESW System in parallel with the SW System, the ESW System would not be negatively affected by this operation such that it would not perform its safety function. The 24 hour Completion Time is acceptable due to the low probability of an additional failure during this time period. This Completion Time is only acceptable provided at least one ESW instrumentation initiation logic system maintains initiation capability. With initiation capability not maintained in both trip systems (ITS 3.3.7.3 ACTION B) an allowance of 1 hour is permitted to restore initiation capability. This Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoration or tripping of channels. Finally, if the Required Action and associated Completion Time of Condition A or B is not met, ITS 3.3.7.3 Required Action C.1 will require the associated ESW subsystem(s) to be declared inoperable. Declaring the associated ESW subsystems(s) inoperable is acceptable since ITS 3.7.2 will only allow a short time period (7 days) with one ESW subsystem inoperable and will require a controlled shutdown with both ESW subsystems inoperable. These changes are considered acceptable since redundant channels are provided, the equipment has been shown to be reliable, each channel is calibrated every 92 days, and since other Technical Specification currently allow these allowances for equipment with equivalent redundancy.

3

L2 A Note is added to CTS 4.11.D.1 (ITS 3.3.7.3 Surveillance Requirements) which allows placing a channel in an inoperable status solely for the performance of required Surveillances, without entering the associated Conditions and Required Actions for up to 6 hours provided the associated Function maintains initiation capability. This 6 hour allowance has been shown to maintain an acceptable risk consistent with the methods used to evaluate other Technical Specification related instrumentation which have already been approved by the NRC. These analyses demonstrated that the 6 hour testing allowance does not significantly reduce the probability that the Technical Specification

TECHNICAL CHANGES - LESS RESTRICTIVE (SPECIFIC)

L2 (continued)

instrumentation will trip or actuate when necessary. JAFNPP has confirmed that the logic design of the ESW instrumentation is similar to other Technical Specification equipment designs and therefore the risk is bounded by that analyzed in those reliability analyses and the conclusions of the analyses are applicable to the JAFNPP ESW System design.

L3 CTS 4.11.D.1.e requires an ESW instrumentation check to be performed once a day. This requirement has been deleted. The ESW pressure instrumentation monitors the reactor building closed loop cooling water pump discharge pressure. This instrumentation does not include any pressure indicators or recorders. JAFNPP has interpreted this requirement to verify the ESW pump discharge pressure and flow once a day. Since the pumps are not normally in operation, this instrumentation check does not provide any meaningful information concerning the OPERABILITY of the ESW System nor the system actuation instrumentation. The Surveillances in ITS 3.7.2, and the Inservice Testing Program will ensure the system remains OPERABLE. The Surveillances in ITS 3.3.7.3 will ensure the ESW pressure instrumentation and initiation logic systems remain OPERABLE to automatically open the ESW pump discharge header valves and close the minimum flow control valve. Therefore the deletion of this requirement is acceptable.

L4 CTS 3.11.D.2 requires the operable Emergency Diesel Generator to be demonstrated to be Operable immediately and daily thereafter when it is determined that one Emergency Service Water (ESW) System is inoperable. This change deletes the explicit requirement to demonstrate the Operability of the Emergency Diesel Generator System (EDG) immediately and daily thereafter when the ESW instrumentation is found to be inoperable. As indicated in L1 three additional Actions have been added to CTS 3.11.D (ITS 3.3.7.3 ACTIONS A, B and C) which will ensure the time allowed with inoperable ESW pressure instrumentation channels is minimized. Failure of any ESW instrumentation channel does not directly influence the Operability of the Emergency Diesel Generator (EDG) components therefore these additional testing requirements have been determined to be excessive. If any Required Action and associated Completion Time of Condition A or B of ITS 3.3.7.3 cannot be met Required Action C.1 will require the associated ESW subsystem(s) to be declared inoperable immediately. This will require entry into ITS LCO 3.7.2 which in turn will require entry into ITS 3.8.1 for any EDG made inoperable. ITS 3.8.1 provides a Completion Time of 24 hours for ITS 3.8.1 Required Action B.3.1, to determine that the Operable EDG subsystem is not inoperable due to common cause failure or ITS 3.8.1

TECHNICAL CHANGES - LESS RESTRICTIVE (SPECIFIC)

L4 (continued)

Required Action B.3.2 will require a performance of SR 3.8.1.2 for the Operable EDG subsystem in the same time period. This change is acceptable since it will allow the plant to concentrate its efforts in restoring inoperable instrumentation channels rather than performing unnecessary testing of EDG components. The normal Surveillances requirements of the EDG are adequate to ensure this equipment remains Operable.

L5 CTS 3.11.D.2 requires the verification that the Emergency Diesel Generator System emergency loads are Operable immediately and daily thereafter when one Emergency Service Water system is found to be inoperable. ITS 3.3.7.3 does not include this explicit requirement. These verifications are an implicit part of using Technical Specifications and determining the appropriate Conditions to enter and Actions to take in the event of inoperability of Technical Specification equipment. The Technical Specifications and ITS 5.5.12, "Safety Function Determination Program" (see Discussion of Changes in ITS Section 5.0) will require a continuous knowledge of all plant equipment. Plant and equipment status is monitored by control room personnel. The results of this monitoring process are documented in records/logs maintained by control room personnel. The continuous monitoring process includes re-evaluating the status of compliance with Technical Specification requirements when Technical Specification equipment becomes inoperable using the control room records/logs as aids. Therefore, the explicit requirement to periodically verify the Operability of the Operable Emergency Diesel Generator System emergency loads is considered to be unnecessary for ensuring compliance with the applicable Technical Specification actions. In addition, the Safety Function Determination Program will require the necessary actions to be taken when a loss of function exists, therefore this change is considered acceptable.

TECHNICAL CHANGES - RELOCATIONS

None

<Insert Page B 3.3-219k> — (K1)

B 3.3 INSTRUMENTATION

B 3.3.7.3 Emergency Service Water (ESW) System Instrumentation

BASES

BACKGROUND

The purpose of the ESW System instrumentation is to initiate appropriate responses from the system to ensure the ESW safe shutdown loads are cooled following a Design Basis Accident (DBA) or transient coincident with a loss of preferred power. The ESW safe shutdown loads are described in the Bases for LCO 3.7.2, "Emergency Service Water (ESW) System and Ultimate Heat Sink (UHS)".

The ESW System may be initiated by either automatic or manual means. Upon receipt of a loss of power signal as described in the Bases of LCO 3.3.8.1, "Loss of Power (LOP) Instrumentation," or an ECCS initiation signal as described in the Bases of LCO 3.3.5.1, "Emergency Core Cooling System Instrumentation," the Emergency Diesel Generators (EDGs) will start, which in turn starts the associated ESW pump. Each ESW pump will automatically pump lake water to the associated EDG cooler. The remaining ESW loads will be automatically cooled when the associated ESW supply header isolation valve opens and the associated ESW minimum flow valve closes. This occurs when the ESW instrumentation initiation logic (known as the ESW lockout matrix) actuates upon low reactor building closed loop cooling water (RBCLCW) pump discharge pressure. In addition, the ESW pumps will automatically start in response to the ESW instrumentation initiation logic. (3)

ESW instrumentation are provided inputs by pressure switches that sense RBCLCW pump discharge pressure. Four channels of ESW instrumentation are provided as input to two one-out-of-two twice initiation logics. Each initiation logic system will open the associated ESW pump discharge header valve, close the minimum flow control valve to ensure cooling water is provided to supply the safe shutdown loads of the ESW System, start the associated ESW pump, and open the associated RBCLCW System discharge valves. However, the opening of the RBCLCW System discharge valves are not required. The opening of these RBCLCW System discharge valves are not necessary since RBCLCW does not cool any safe shutdown loads. Each channel consists of a pressure sensor and switch, that compares measured input signals with pre-established setpoints. When the setpoint is exceeded, the

(continued)

<Insert Page B 3.3-2192> (k1)

BASES

BACKGROUND (continued)	channel outputs a RBCLCW pump discharge initiation signal to both ESW initiation logic circuits.

APPLICABLE SAFETY ANALYSES

The actions of the ESW System are implicitly assumed in the safety analyses of References 1 and 2. The ESW System instrumentation is required to be OPERABLE to support the ESW System. Refer to LCO 3.7.2 for Applicable Safety Analyses Bases of ESW System.

The ESW System instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 3).

LCO

The LCO requires four ESW instrumentation channels, which monitor the RBCLCW pump discharge header pressure, to be OPERABLE. The four channels provide input to both logic systems to ensure that no single instrument failure will prevent ESW from supplying the safe shutdown loads. Each channel must have its setpoint set within the specified Allowable Value of SR 3.3.7.3.1. The Allowable Value is set high enough to ensure logic initiation during a complete loss of the RBCLCW System and low enough to avoid logic initiation during small RBCLCW System pressure transients. The actual setpoint is calibrated to be consistent with the applicable setpoint methodology assumptions. Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the setpoints do not exceed the Allowable Value between successive CHANNEL CALIBRATIONS. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

Trip setpoints are those predetermined values of output at which an action should take place. The setpoints are compared to the actual process parameter (i.e., RBCLCW pump discharge header pressure), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., pressure switch) changes state. The analytic limit is derived from the limiting values of the process parameters obtained from the safety analysis or other appropriate documents. The trip setpoint is derived

(continued)

(Insert Page B 3.3-219n) (k1)

BASES

ACTIONS

A.1 (continued)

Bases of LCO 3.5.1, "Emergency Core Cooling System - Operating".

This out of service time is only acceptable provided the ESW pressure channels are still maintaining actuation capability (refer to Required Action B.1 Bases). If the inoperable channel cannot be restored to OPERABLE status within the Completion Time, the channel must be placed in the tripped condition per Required Action A.1. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue with no further restrictions. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an ESW System initiation), Condition C must be entered and its Required Action taken. 1 (5)

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels result in redundant automatic initiation capability being lost for both ESW initiation logic systems. The ESW initiation logic systems are considered to be maintaining initiation capability when sufficient channels are OPERABLE or in trip such that one logic system will generate an initiation signal from the given Function on a valid signal. This will ensure that at least one ESW System will receive an initiation signal. 1 (5)

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The Completion Time is acceptable because it minimizes risk while allowing for restoration or tripping of channels.

C.1

If any Required Action and associated Completion Time of Condition A or B are not met, the associated ESW subsystem(s) must be declared inoperable immediately. This declaration also requires entry into applicable Conditions and Required Actions for inoperable ESW subsystem(s) in LCO 3.7.2.

(continued)

BASES (continued) <Insert Page B 3.3-219o> <K1>

SURVEILLANCE REQUIREMENTS

The Surveillances are modified by a Note to indicate that when a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains ESW initiation capability. Upon completion of the Surveillance, or expiration of the 6 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken. This Note is based on a reliability analysis assumption that 6 hours is the average time required to perform channel Surveillance. That analysis demonstrated that the 6 hour testing allowance does not significantly reduce the probability that the ESW initiation will occur when necessary.

SR 3.3.7.3.1

CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequency is based upon the assumption of a 92 day calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.7.3.2

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional test performed in LCO 3.7.2 overlaps this Surveillance to provide complete testing of the safety function.

(continued)

BASES ⟨Insert Page B 3.3-219p⟩ {K1}

SURVEILLANCE REQUIREMENTS

SR 3.3.7.3.2 (continued)

The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 24 month Frequency.

REFERENCES

1. UFSAR, Chapter 5.
2. UFSAR, Chapter 14.
3. 10 CFR 50.36(c)(2)(ii).

B 3.3 INSTRUMENTATION

B 3.3.7.3 Emergency Service Water (ESW) System Instrumentation

BASES

BACKGROUND

The purpose of the ESW System instrumentation is to initiate appropriate responses from the system to ensure the ESW safe shutdown loads are cooled following a Design Basis Accident (DBA) or transient coincident with a loss of preferred power. The ESW safe shutdown loads are described in the Bases for LCO 3.7.2, "Emergency Service Water (ESW) System and Ultimate Heat Sink (UHS)".

The ESW System may be initiated by either automatic or manual means. Upon receipt of a loss of power signal as described in the Bases of LCO 3.3.8.1, "Loss of Power (LOP) Instrumentation," or an ECCS initiation signal as described in the Bases of LCO 3.3.5.1, "Emergency Core Cooling System Instrumentation," the Emergency Diesel Generators (EDGs) will start, which in turn starts the associated ESW pump. Each ESW pump will automatically pump lake water to the associated EDG cooler. The remaining ESW loads will be automatically cooled when the associated ESW supply header isolation valve opens and the associated ESW minimum flow valve closes. This occurs when the ESW instrumentation initiation logic (known as the ESW lockout matrix) actuates upon low reactor building closed loop cooling water (RBCLCW) pump discharge pressure. In addition, the ESW pumps will automatically start in response to the ESW instrumentation initiation logic.

ESW instrumentation are provided inputs by pressure switches that sense RBCLCW pump discharge pressure. Four channels of ESW instrumentation are provided as input to two one-out-of-two twice initiation logics. Each initiation logic system will open the associated ESW pump discharge header valve, close the minimum flow control valve to ensure cooling water is provided to supply the safe shutdown loads of the ESW System, start the associated ESW pump, and open the associated RBCLCW System discharge valves. However, the opening of the RBCLCW System discharge valves are not required. The opening of these RBCLCW System discharge valves are not necessary since RBCLCW does not cool any safe shutdown loads. Each channel consists of a pressure sensor and switch, that compares measured input signals with pre-established setpoints. When the setpoint is exceeded,

(continued)

BASES

BACKGROUND (continued)

the channel outputs a RBCLCW pump discharge initiation signal to both ESW initiation logic circuits.

APPLICABLE SAFETY ANALYSES

The actions of the ESW System are implicitly assumed in the safety analyses of References 1 and 2. The ESW System instrumentation is required to be OPERABLE to support the ESW System. Refer to LCO 3.7.2 for Applicable Safety Analyses Bases of ESW System.

The ESW System instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 3).

LCO

The LCO requires four ESW instrumentation channels, which monitor the RBCLCW pump discharge header pressure, to be OPERABLE. The four channels provide input to both logic systems to ensure that no single instrument failure will prevent ESW from supplying the safe shutdown loads. Each channel must have its setpoint set within the specified Allowable Value of SR 3.3.7.3.1. The Allowable Value is set high enough to ensure logic initiation during a complete loss of the RBCLCW System and low enough to avoid logic initiation during small RBCLCW System pressure transients. The actual setpoint is calibrated to be consistent with the applicable setpoint methodology assumptions. Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the setpoints do not exceed the Allowable Value between successive CHANNEL CALIBRATIONS. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value.

Trip setpoints are those predetermined values of output at which an action should take place. The setpoints are compared to the actual process parameter (i.e., RBCLCW pump discharge header pressure), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., pressure switch) changes state. The analytic limit is derived from the limiting values of the process parameters obtained from the safety analysis or other appropriate documents. The trip setpoint is derived

(continued)

BASES

ACTIONS

A.1 (continued)

Bases of LCO 3.5.1, "Emergency Core Cooling System - Operating".

This out of service time is only acceptable provided the ESW pressure channels are still maintaining actuation capability (refer to Required Action B.1 Bases). If the inoperable channel cannot be restored to OPERABLE status within the Completion Time, the channel must be placed in the tripped condition per Required Action A.1. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue with no further restrictions. Alternately, if it is not desired to place the channel in trip (e.g., as in the case where placing the inoperable channel in trip would result in an ESW System initiation), Condition C must be entered and its Required Action taken.

B.1

Required Action B.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels result in redundant automatic initiation capability being lost for both ESW initiation logic systems. The ESW initiation logic systems are considered to be maintaining initiation capability when sufficient channels are OPERABLE or in trip such that one logic system will generate an initiation signal from the given Function on a valid signal. This will ensure that at least one ESW System will receive an initiation signal.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The Completion Time is acceptable because it minimizes risk while allowing for restoration or tripping of channels.

C.1

If any Required Action and associated Completion Time of Condition A or B are not met, the associated ESW subsystem(s) must be declared inoperable immediately. This declaration also requires entry into applicable Conditions and Required Actions for inoperable ESW subsystem(s) in LCO 3.7.2.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.7.3.2 (continued)

pass the Surveillance when performed at the 24 month Frequency.

REFERENCES

1. UFSAR, Chapter 5.
2. UFSAR, Chapter 14.
3. 10 CFR 50.36(c)(2)(ii).

3.3 INSTRUMENTATION

3.3.8.1 Loss of Power (LOP) Instrumentation

[3.2.I] LCO 3.3.8.1 The LOP instrumentation for each Function in Table 3.3.8.1-1 shall be OPERABLE.

[M2] APPLICABILITY: MODES 1, 2, and 3,
When the associated emergency diesel generator (EDG) subsystem is required to be OPERABLE by LCO 3.8.2, "AC Sources—Shutdown." PA1 J

ACTIONS

---NOTE---
[A3] Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
[T3.2-2 Note 10 and 10.A] A. One or more channels inoperable.	A.1 Place channel in trip.	1 hour
[T3.2-2 Note 10.B] B. Required Action and associated Completion Time not met.	B.1 Declare associated ~~diesel generator (DG)~~ EDG(s) inoperable.	Immediately PA1

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SURVEILLANCE REQUIREMENTS

---NOTES---

[A5] 1. Refer to Table 3.3.8.1-1 to determine which SRs apply for each LOP Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 2 hours provided the associated Function maintains DG initiation capability.

SURVEILLANCE	FREQUENCY
SR 3.3.8.1.1 Perform CHANNEL CHECK.	12 hours
SR 3.3.8.1.2 Perform CHANNEL FUNCTIONAL TEST.	31 days
[T 4.2-2] SR 3.3.8.1.3 (1) Perform CHANNEL CALIBRATION.	18 (24) months
[M2] SR 3.3.8.1.4 (2) Perform LOGIC SYSTEM FUNCTIONAL TEST.	18 (24) months

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B 3.3 INSTRUMENTATION

B 3.3.8.1 Loss of Power (LOP) Instrumentation

BASES

BACKGROUND

Successful operation of the required safety functions of the Emergency Core Cooling Systems (ECCS) is dependent upon the availability of adequate power sources for energizing the various components such as pump motors, motor operated valves, and the associated control components. The LOP instrumentation monitors the 4.16 kV emergency buses. Offsite power is the preferred source of power for the 4.16 kV emergency buses. If the monitors determine that insufficient power is available, the buses are disconnected from the offsite power sources and connected to the onsite diesel generator (DG) power sources.

Each 4.16 kV emergency bus has its own independent LOP instrumentation and associated trip logic. The voltage for each bus is monitored at two levels, which can be considered as two different undervoltage Functions: Loss of Voltage and 4.16 kV Emergency Bus Undervoltage Degraded Voltage. Each Function causes various bus transfers and disconnects. Each Function is monitored by two undervoltage relays for each emergency bus, whose outputs are arranged in a two-out-of-two logic configuration (Ref. 1). The channels include electronic equipment (e.g., trip units) that compares measured input signals with pre-established setpoints. When the setpoint is exceeded, the channel output relay actuates, which then outputs a LOP trip signal to the trip logic.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The LOP instrumentation is required for Engineered Safety Features to function in any accident with a loss of offsite power. The required channels of LOP instrumentation ensure that the ECCS and other assumed systems powered from the DGs, provide plant protection in the event of any of the Reference 2, 3, and 4 analyzed accidents in which a loss of offsite power is assumed. The initiation of the DGs on loss of offsite power, and subsequent initiation of the ECCS, ensure that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

(continued)

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INSERT BKGD-1

Each 4.16 kV Emergency Bus Loss of Voltage Function and Degraded Voltage Function is monitored by two undervoltage relays for each emergency bus. These relay outputs are arranged in a two-out-of-two logic configuration for each 4.16 kV Emergency Bus Loss of Voltage and Degraded Voltage Function. The Emergency Bus Undervoltage and Degraded Voltage Function signals provide input to their respective Bus Undervoltage and Degraded Voltage-Time Delay Functions. Each 4.16 kV Emergency Bus has one Loss of Voltage-Time Delay relay. The Degraded Voltage Function utilizes two time delay relays, one time delay for a bus undervoltage (degraded voltage) in conjunction with a loss of coolant accident (LOCA) signal and the other for a bus undervoltage (degraded voltage) without a LOCA (non-LOCA). When a voltage Function setpoint has been exceeded and the respective time delay completed, the time delay relay will start the associated EDG subsystem, trip the associated breakers providing normal, backfeed or reserve power, trip all associated 4.16 kV motor breakers (after EDG reaches 75% of rated voltage), initiate EDG breaker close permissive (in conjunction with 90% of rated voltage), and initiate sequential starting of the ECCS pumps if the LOCA signal is present. The sequential starting of the ECCS pumps is not considered part of the LOP Instrumentation and is tested in LCO 3.8.1, "AC Sources – Operating," and LCO 3.8.2, "AC Sources – Shutdown." 1(J)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis. The Loss of Voltage Function is monitored via the secondary windings of two transformers associated with each emergency bus.

1. 4.16 kV Emergency Bus Undervoltage (Loss of Voltage)

Loss of voltage on a 4.16 kV emergency bus indicates that offsite preferred power may be completely lost to the respective emergency bus and is unable to supply sufficient power for proper operation of the applicable equipment. Therefore, the power supply to the bus is transferred from offsite power the preferred power source to DG power when the voltage on the bus drops below the Loss of Voltage Function Allowable Values (loss of voltage with a short time delay). This ensures that adequate power will be available to the required equipment.

The 4.16 kV Emergency Bus Undervoltage (Loss of Voltage) Allowable Values are is low enough to prevent inadvertent spurious power supply transfer, but high enough to ensure that power is available to the required equipment. The Allowable Value corresponds to approximately 71.5 % of nominal emergency bus voltage. The Time Delay Allowable Values are long enough to provide time for the offsite preferred power supply to recover to normal voltages, but short enough to ensure that power is available to the required equipment.

Two channels of 4.16 kV Emergency Bus Undervoltage (Loss of Voltage) Function and one channel of Loss of Voltage—Time Delay per associated emergency bus are only required to be OPERABLE when the associated DG is required to be OPERABLE to ensure that no single instrument failure can preclude the DG function. ~~Two channels input to each of the three DGs.~~ Refer to LCO 3.8.1, "AC Sources—Operating," and LCO 3.8.2, "AC Sources—Shutdown," for Applicability Bases for the DGs.

2. 4.16 kV Emergency Bus Undervoltage (Degraded Voltage)

A reduced voltage condition on a 4.16 kV emergency bus indicates that, while offsite preferred power may not be completely lost to the respective emergency bus, available power may be insufficient for starting large ECCS motors without risking damage to the motors that could disable the ECCS function. The Degraded Voltage Function is monitored via the secondary windings of two transformers associated with each emergency bus. Therefore, power supply to the bus is transferred from offsite power the preferred power source to onsite DG power when the voltage on the bus drops below the Degraded Voltage Function Allowable Values

(continued)

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3.3 INSTRUMENTATION

3.3.8.1 Loss of Power (LOP) Instrumentation

LCO 3.3.8.1 The LOP instrumentation for each Function in Table 3.3.8.1-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
When the associated emergency diesel generator (EDG) subsystem is required to be OPERABLE by LCO 3.8.2, "AC Sources – Shutdown."

ACTIONS

------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each channel.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more channels inoperable.	A.1 Place channel in trip.	1 hour
B. Required Action and associated Completion Time not met.	B.1 Declare associated EDG(s) inoperable.	Immediately

B 3.3 INSTRUMENTATION

B 3.3.8.1 Loss of Power (LOP) Instrumentation

BASES

BACKGROUND

Successful operation of the required safety functions of the Emergency Core Cooling Systems (ECCS) is dependent upon the availability of adequate power sources for energizing the various components such as pump motors, motor operated valves, and the associated control components. The LOP instrumentation monitors the 4.16 kV emergency buses. The Main Generator (normal), the 115 kV transmission network (reserve), the 345 kV transmission network (backfeed) are the preferred sources of power for the 4.16 kV emergency buses. If the monitors determine that insufficient power is available, the buses are disconnected from these power sources and connected to the onsite emergency diesel generator (EDG) power sources.

Each 4.16 kV emergency bus has its own independent LOP instrumentation and associated trip logic. The voltage for each bus is monitored at two levels, which can be considered as two different types of undervoltage protection Functions: Loss of Voltage and Degraded Voltage (Ref. 1). Each 4.16 kV Emergency Bus Loss of Voltage Function and Degraded Voltage Function is monitored by two undervoltage relays for each emergency bus. These relay outputs are arranged in a two-out-of-two logic configuration for each 4.16 kV Emergency Bus Loss of Voltage and Degraded Voltage Function. The Emergency Bus Undervoltage and Degraded Voltage Function signals provide input to their respective Bus Undervoltage and Degraded Voltage-Time Delay Functions. Each 4.16 kV Emergency Bus has one Loss of Voltage-Time Delay relay. The Degraded Voltage Function utilizes two time delay relays, one time delay for a bus undervoltage (degraded voltage) in conjunction with a loss of coolant accident (LOCA) signal and the other for a bus undervoltage (degraded voltage) without a LOCA (non-LOCA). When a voltage Function setpoint has been exceeded and the respective time delay completed, the time delay relay will start the associated EDG subsystem, trip the associated breakers providing normal, backfeed, or reserve power, trip all associated 4.16 kV motor breakers (after EDG reaches 75% of rated voltage), initiate EDG breaker close permissive (in conjunction with 90% of rated voltage), and initiate sequential starting of

(continued)

BASES

BACKGROUND (continued)

the ECCS pumps if the LOCA signal is present. The sequential starting of the ECCS pumps is not considered part of the LOP Instrumentation and is tested in LCO 3.8.1, "AC Sources - Operating," and LCO 3.8.2, "AC Sources - Shutdown." The channels include electronic equipment (e.g., internal relay contacts, coils) that compares measured input signals with pre-established setpoints. When the setpoint is exceeded, the channel output relay actuates, which then outputs a LOP trip signal to the trip logic.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The LOP instrumentation is required for Engineered Safeguards to function in any accident with a loss of the preferred power sources. The required channels of LOP instrumentation ensure that the ECCS and other assumed systems powered from the EDGs, provide plant protection in the event of any of the Reference 2 and 3 analyzed accidents in which a loss of all the preferred power sources are assumed. The initiation of the EDGs on loss of all the preferred power sources, and subsequent initiation of the ECCS, ensure that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Accident analyses credit the loading of the EDGs based on the loss of the preferred power sources during a loss of coolant accident. The emergency diesel starting and loading times have been included in the delay time associated with each safety system component requiring EDG supplied power following a loss of the preferred power sources.

The LOP instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) (Ref. 4).

The OPERABILITY of the LOP instrumentation is dependent upon the OPERABILITY of the individual instrumentation channel Functions specified in Table 3.3.8.1-1. Each Function must have a required number of OPERABLE channels per 4.16 kV emergency bus, with their setpoints within the specified Allowable Values. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1. 4.16 kV Emergency Bus Undervoltage (Loss of Voltage) (continued)

ensures that adequate power will be available to the required equipment.

The 4.16 kV Emergency Bus Undervoltage (Loss of Voltage) Allowable Value is low enough to prevent spurious power supply transfer, but high enough to ensure that power is available to the required equipment. The Allowable Value corresponds to approximately 71.5% of nominal emergency bus voltage. The Time Delay Allowable Values are long enough to provide time for the preferred power supply to recover to normal voltages, but short enough to ensure that power is available to the required equipment.

Two channels of 4.16 kV Emergency Bus Undervoltage (Loss of Voltage) Function and one channel of Loss of Voltage-Time Delay per associated emergency bus are required to be OPERABLE when the associated EDG is required to be OPERABLE to ensure that no single instrument failure can preclude the EDG function. Refer to LCO 3.8.1 and LCO 3.8.2 for Applicability Bases for the EDGs. J

2. 4.16 kV Emergency Bus Undervoltage (Degraded Voltage)

A reduced voltage condition on a 4.16 kV emergency bus indicates that, while preferred power may not be completely lost to the respective emergency bus, available power may be insufficient for starting large ECCS motors without risking damage to the motors that could disable the ECCS function. The Degraded Voltage Function is monitored via the secondary windings of two transformers associated with each emergency bus. Therefore, power supply to the bus is transferred from the preferred power source to onsite EDG power when the voltage on the bus drops below the Degraded Voltage Function Allowable Values (degraded voltage with a time delay). This ensures that adequate power will be available to the required equipment.

The 4.16 kV Bus Undervoltage (Degraded Voltage) Allowable Value is low enough to prevent spurious power supply transfer, but high enough to ensure that sufficient power is

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2. 4.16 kV Emergency Bus Undervoltage (Degraded Voltage) (continued)

available to the required equipment. The Allowable Value corresponds to approximately 93% of nominal emergency bus voltage. The Time Delay Allowable Values are long enough to provide time for the preferred power supply to recover to normal voltages, but short enough to ensure that sufficient power is available to the required equipment.

Two channels of 4.16 kV Emergency Bus Undervoltage (Degraded Voltage) Function, one channel of Degraded Voltage-Time Delay (LOCA), and one channel of Degraded Voltage-Time Delay (non-LOCA) per associated bus are required to be OPERABLE when the associated EDG is required to be OPERABLE to ensure that no single instrument failure can preclude the EDG function. Refer to LCO 3.8.1 and LCO 3.8.2 for Applicability Bases for the EDGs.

ACTIONS

A Note has been provided to modify the ACTIONS related to LOP instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable LOP instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable LOP instrumentation channel.

A.1

With one or more channels of a Function inoperable, the Function is not capable of performing the intended function. Therefore, only 1 hour is allowed to restore the inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the

(continued)

B 3.3 INSTRUMENTATION

B 3.3.8.2 Reactor Protection System (RPS) Electric Power Monitoring

BASES

BACKGROUND

RPS Electric Power Monitoring System is provided to isolate the RPS bus from the motor generator (MG) set or an alternate power supply in the event of overvoltage, undervoltage, or underfrequency. This system protects the loads connected to the RPS bus against unacceptable voltage and frequency conditions (Ref. 1) and forms an important part of the primary success path of the essential safety circuits. Some of the essential equipment powered from the RPS buses includes the RPS logic, scram solenoids, and various valve isolation logic.

RPS electric power monitoring assembly will detect any abnormal high or low voltage or low frequency condition in the outputs of the two MG sets or the alternate power supply and will de-energize its respective RPS bus, thereby causing all safety functions normally powered by this bus to de-energize.

In the event of failure of an RPS Electric Power Monitoring System (e.g., both inseries electric power monitoring assemblies), the RPS loads may experience significant effects from the unregulated power supply. Deviation from the nominal conditions can potentially cause damage to the scram solenoids and other Class 1E devices.

In the event of a low voltage condition for an extended period of time, the scram solenoids can chatter and potentially lose their pneumatic control capability, resulting in a loss of primary scram action.

In the event of an overvoltage condition, the RPS logic relays and scram solenoids (as well as the main steam isolation valve (MSIV) solenoids), may experience a voltage higher than their design voltage. If the overvoltage condition persists for an extended time period, it may cause equipment degradation and the loss of plant safety function.

Two redundant Class 1E circuit breakers are connected in series between each RPS bus and its MG set, and between each RPS bus and its alternate power supply. Each of these

(continued)

TA1 INSERT SR 3.3.8.2.1

A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. 1 J

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.8.2.2 (continued)

The Frequency is based on the assumption of an 18 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.8.2.3

Performance of a system functional test demonstrates that, with a required system actuation (simulated or actual) signal, the logic of the system will automatically trip open the associated power monitoring assembly. Only one signal per power monitoring assembly is required to be tested. This Surveillance overlaps with the CHANNEL CALIBRATION to provide complete testing of the safety function. The system functional test of the Class 1E circuit breakers is included as part of this test to provide complete testing of the safety function. If the breakers are incapable of operating, the associated electric power monitoring assembly would be inoperable.

The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency.

REFERENCES

1. FSAR, Section [8.3.1.1.4.B].

2. NRC Generic Letter 91-09, "Modification of Surveillance Interval for the Electrical Protective Assemblies in Power Supplies for the Reactor Protection System."

The system functional test shall include actuation of the protective relays, tripping logic, and output circuit breakers.

and SR 3.3.8.2.3

2. 10 CFR 50.36(c)(2)(ii)

June 1991.

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B 3.3 INSTRUMENTATION

B 3.3.8.2 Reactor Protection System (RPS) Electric Power Monitoring

BASES

BACKGROUND

RPS Electric Power Monitoring System is provided to isolate the RPS bus from the motor generator (MG) set or an alternate power supply in the event of overvoltage, undervoltage, or underfrequency. This system protects the loads connected to the RPS bus against unacceptable voltage and frequency conditions (Ref. 1) and forms an important part of the primary success path of the essential safety circuits. Some of the essential equipment powered from the RPS buses includes the RPS logic, scram pilot valve solenoids, and various valve isolation logic. 1/J

RPS electric power monitoring assembly will detect any abnormal high or low voltage or low frequency condition in the outputs of the two MG sets or the alternate power supply and will de-energize its respective RPS bus, thereby causing all safety functions normally powered by this bus to de-energize. (Safety functions powered by the RPS buses deenergize to actuate.)

In the event of failure of an RPS Electric Power Monitoring System (e.g., both in-series electric power monitoring assemblies), the RPS loads may experience significant effects from the unregulated power supply. Deviation from the nominal conditions can potentially cause damage to the scram pilot valve solenoids and other Class 1E devices.

In the event of a low voltage condition for an extended period of time, the scram pilot valve solenoids can chatter and potentially lose their pneumatic control capability, resulting in a loss of primary scram action.

In the event of an overvoltage condition, the RPS logic relays and scram pilot valve solenoids may experience a voltage higher than their design voltage. If the overvoltage condition persists for an extended time period, it may cause equipment degradation and the loss of plant safety function.

Two redundant Class 1E circuit breakers are connected in series between each RPS bus and its MG set, and between each RPS bus and its alternate power supply. Each of these

(continued)

BASES

ACTIONS

D.1 (continued)

reactor core and ensures that the safety function of the RPS (e.g., scram of control rods) is not required. All actions must continue until the applicable Required Actions are completed.

SURVEILLANCE REQUIREMENTS

SR 3.3.8.2.1

A CHANNEL FUNCTIONAL TEST is performed on each overvoltage, undervoltage, and underfrequency channel to ensure that the entire channel will perform the intended function. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology. 1/J\

As noted in the Surveillance, the CHANNEL FUNCTIONAL TEST is only required to be performed while the plant is in a condition in which the loss of the RPS bus will not jeopardize steady state power operation (the design of the system is such that the power source must be removed from service to conduct the Surveillance). The 24 hours is intended to indicate an outage of sufficient duration to allow for scheduling and proper performance of the Surveillance.

The 184 day Frequency and the Note in the Surveillance are based on guidance provided in Generic Letter 91-09 (Ref. 3).

SR 3.3.8.2.2 and SR 3.3.8.2.3

CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies that the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel

(continued)

SUMMARY OF CHANGES TO ITS SECTION 3.4 - REVISION J

Source of Change	Summary of Change	Affected Pages
Retyped ITS typographical errors	Minor typographical errors in the retyped ITS have been corrected to be consistent with the NUREG markup. (The word "and" has been deleted from LCO 3.4.1.b; and the word "is" has been added to SR 3.4.9.5.)	**Specification 3.4.1** Retyped ITS p 3.4-1 **Specification 3.4.9** Retyped ITS p 3.4-22
NUREG ITS markup error	A minor NUREG markup error has been corrected to be consistent with the retyped ITS. (The word "Note" has been changed to "Not" in ITS 3.4.9 Insert Note 2.)	**Specification 3.4.9** NUREG ITS markup p Insert page 3.4-25
Retyped ITS Bases typographical errors	Minor typographical errors in the retyped ITS Bases have been corrected to be consistent with the NUREG Bases markup. (The words "Design Basis" have been changed to "design basis" in the ITS 3.4.1 ASA section; the incorrect spelling in the ASA header (Analysis) has been corrected; a long dash has been used in lieu of a short dash (two places) in the ASA and LCO Bases section of ITS 3.4.1 (in Function names); the term "Recirculation Water System" has been changed to "Recirculation System" in the ITS 3.4.1 Applicability section; a comma has been added to the ITS 3.4.1 Actions B.1 section; the words "Design Basis" have been changed to "design basis" in the ITS 3.4.2 Actions A.1 section; the short dash in the title "ECCS-Operating" of ITS 3.4.3 Background Bases section has been changed to a long dash; the word "pump" has been added to the ITS 3.4.5 Background section; the words "or indication" have been added to two places in ITS 3.4.5 ASA section; the word "of" has been changed to "for" in the ITS 3.4.5 ACTIONS B.1 section; the word "subsystems" has been changed to "subsystem" in the ITS 3.4.7 LCO section; a comma has been added to the SR 3.4.9.3, SR 3.4.9.4, and SR 3.4.9.5 section; the word "Of" has been decapitalized in ITS 3.4.9 Reference 5; and the word "Alternate" has been changed to "Alternative" in ITS 3.4.9 Reference 12.)	**Specification 3.4.1** Retyped ITS Bases p B 3.4-2, B 3.4-3, and B 3.4-5 **Specification 3.4.2** Retyped ITS Bases p B 3.4-10 **Specification 3.4.3** Retyped ITS Bases p B 3.4-14 **Specification 3.4.5** Retyped ITS Bases p B 3.4-25, B 3.4-27, and B 3.4-28 **Specification 3.4.7** Retyped ITS Bases p B 3.4-36 **Specification 3.4.9** Retyped ITS Bases p B 3.4-52 and B 3.4-54

<u>SUMMARY OF CHANGES TO ITS SECTION 3.4 - REVISION J</u>

Source of Change	Summary of Change	Affected Pages
NUREG Bases markup errors	Minor NUREG Bases markup errors have been corrected to be consistent with the retyped ITS Bases. (The document number for ITS 3.4.1 Reference 7 has been changed from "004" to "044"; a period has been added to the ITS 3.4.2 ASA section; a period has been added to ITS 3.4.2 Reference 2; a close parenthesis has been added to the ITS 3.4.3 LCO section; periods have been added to ITS 3.4.3 References 4 and 5; ITS 3.4.3 Reference 4 has been properly numbered; the word "the" has been added to ITS 3.4.4 Background section; a dash has been added to the ITS 3.4.5 Background section; a period has been added to ITS 3.4.7 Reference 1; a comma has been added to the ITS 3.4.8 LCO section; a period has been added to ITS 3.4.8 Reference 1; a period has been added to the ITS 3.4.9 LCO section; and the word "without" has been capitalized in ITS 3.4.9 Reference 12)	**<u>Specification 3.4.1</u>** NUREG Bases markup p Insert Page B 3.4-6 **<u>Specification 3.4.2</u>** NUREG Bases markup p B 3.4-8 and B 3.4-11 **<u>Specification 3.4.3</u>** NUREG Bases markup p B 3.4-13 and B 3.4-16 **<u>Specification 3.4.4</u>** NUREG Bases markup p B 3.4-17 **<u>Specification 3.4.5</u>** NUREG Bases markup p B 3.4-28 **<u>Specification 3.4.7</u>** NUREG Bases markup p B 3.4-41 **<u>Specification 3.4.8</u>** NUREG Bases markup p B 3.4-42 and B 3.4-46 **<u>Specification 3.4.9</u>** NUREG Bases markup p B 3.4-49 and Insert Page B 3.4-54

SUMMARY OF CHANGES TO ITS SECTION 3.4 - REVISION J

Source of Change	Summary of Change	Affected Pages
Typographical errors	Minor typographical errors have been corrected in the Discussion of Changes, NUREG Bases markups, and the retyped ITS Bases. (A period has been added at the end of a sentence in the ASA section (after "Specification 5.6.5"); the second dash High in the APRM Neutron Flux - High (Flow Biased) Functions name and the dash between the words "Flow" and "Biased" have been deleted in ITS 3.4.1 LCO Bases; the word "surveillance" has been capitalized in the SR 3.4.1.1 Bases; the date of ITS 3.4.2 Reference 3 has been changed from 1990 to 1980; the words "All S/RVs" have been changed to "Each S/RV" for grammatical correctness; the word "includes" has been changed to "include" in the ITS 3.4.3 LCO Bases section and the term "safe lift settings" has been changed to "safety function lift settings"; the words "Table 3.2-6" have been changed to "Table 3.2-5" in ITS 3.4.5 DOC L5.)	**Specification 3.4.1** NUREG Bases markup p B 3.4-3, Insert Page B 3.4-3, and Insert Page B 3.4-5 Retyped ITS Bases p B 3.4-4 and B 3.4-7 **Specification 3.4.2** NUREG Bases markup p B 3.4-11 Retyped ITS Bases p B 3.4-13 **Specification 3.4.3** NUREG Bases markup p Insert Page B 3.4-12, B 3.4-13, and B 3.4-15 Retyped ITS Bases p B 3.4-14, B 3.4-15, and B 3.4-17 **Specification 3.4.5** DOC L5 (DOCs p 5 of 5)

Source of Change	Summary of Change	Affected Pages
Consistency issues	Minor consistency issue corrections have been made. (The term "One or more recirculation loop(s)" has been changed to "One or more recirculation loops" in ITS 3.4.1 Condition A consistent with the usage throughout the ITS; the words "Updated Final Safety Analysis Report (UFSAR)" in the ITS 3.4.1 ASA Bases section have been changed to "UFSAR" consistent with its usage throughout the ITS Bases; the term "APRM Neutron-Flux (Startup) High" in SR 3.4.1.1 Bases has been changed to "APRM Neutron Flux - High (Startup), consistent with the title of the Function in ITS 3.3.1.1; the words "while in MODE 2" have been added to the last sentence of SR 3.4.1.1 Bases, since this is when the APRM Function is applicable; the title of LCO 3.4.1 has been deleted in the ITS 3.4.2 Applicability Bases section since it is defined earlier in the Bases; the value "9" (three places) in ITS 3.4.3 Bases has been changed to "nine"; the term 1" has been changed to 1 inch in the ITS 3.4.4 Background Bases section; quotation marks have been placed around the LCO 3.3.6.1 title in the ITS 3.4.7 LCO Bases section; the wording of SR 3.4.7.1 and SR 3.4.8.1 has been changed to be consistent with the wording of similar Surveillances, i.e., SRs 3.1.7.6, 3.6.1.8.1, 3.6.1.9.1, 3.6.2.3.1, 3.6.3.2.2, and 3.7.1.1; the wording in the LCO 3.4.8 Bases section, with regard to the number of RHRSW pumps needed, has been modified to be consistent with the wording in the ITS 3.4.7 LCO Bases; CONTINUED ON NEXT PAGE	**Specification 3.4.1** NUREG ITS markup p Insert Page 3.4-1 NUREG Bases markup p Insert Page B 3.4-3 and Insert Page B 3.4-5 Retyped ITS p 3.4-2 Retyped ITS Bases p B 3.4-3 and B 3.4-7 **Specification 3.4.2** NUREG Bases markup p B 3.4-8 Retyped ITS Bases p B 3.4-10 **Specification 3.4.3** NUREG Bases markup p B 3.4-12 and B 3.4-13 Retyped ITS Bases p B 3.4-15 **Specification 3.4.4** NUREG Bases markup p B 3.4-17 Retyped ITS Bases p B 3.4-19 **Specification 3.4.7** NUREG ITS markup p 3.4-20 NUREG Bases markup p B 3.4-38 Retyped ITS p 3.4-15 Retyped ITS Bases p B 3.4-36 **Specification 3.4.8** NUREG ITS markup p 3.4-22 NUREG Bases markup p B 3.4-43 Retyped ITS p 3.4-17 Retyped ITS Bases p B 3.4-40 and B 3.4-41

SUMMARY OF CHANGES TO ITS SECTION 3.4 - REVISION J

Source of Change	Summary of Change	Affected Pages
Consistency issues (continued)	a semicolon has replaced a period and the word "and" has been added to SR 3.4.9.1.a for consistency with the manner in which two part SRs are written; the word "line" has been added to SR 3.4.9.3 Bases to be consistent with an LA DOC; the word "performed" has been changed to "met" in two places in the SR 3.4.9.3/4/5 Bases to be consistent with the wording in the Notes of the actual SRs; the words "ensures there is no stratification" in the SR 3.4.9.3/4/5 Bases have been changed to "verifies the stratification limit is met" to be consistent with the actual purpose of SR 3.4.9.3; and the words "head bolting" have been added to the SR 3.4.9.6/7/8 Bases (three places) to be consistent with plant terminology.)	**Specification 3.4.9** NUREG ITS markup p 3.4-24 NUREG Bases markup p B 3.4-53, Insert Page B 3.4-53, and B 3.4-54 Retyped ITS p 3.4-20 Retyped ITS Bases p B 3.4-52 and B 3.4-53
Consistency issues	The Bases for the Leakage and the Leakage Detection Instrumentation Technical Specification (ITS 3.4.4 and ITS 3.4.5) have been modified to be consistent with the UFSAR and the current licensing basis. Specifically, JAFNPP specific references and descriptions have been included in lieu of the generic references and descriptions in the NUREG. For example, the NUREG uses Regulatory Guide 1.45 as a reference for certain requirements, but JAFNPP is not committed to RG 1.45.	**Specification 3.4.4** NUREG Bases markup p B 3.4-18, Insert Page B 3.4-18, B 3.4-21, and Insert Page B 3.4-21 Retyped ITS Bases p B 3.4-20, B 3.4-23, and B 3.4-24 **Specification 3.4.5** NUREG Bases markup p B 3.4-27, Insert Page B 3.4-27, B 3.4-28, Insert Page B 3.4-28, B 3.4-29, and Insert Page B 3.4-32 Retyped ITS Bases p B 3.4-25, B 3.4-26, B 3.4-27, B 3.4-30, and B 3.4-31
Editorial	The proper References have been provided for the ITS 3.4.1 Bases and the References have been placed in the proper order. In addition, a period has been added at the end of Reference 4.	**Specification 3.4.1** NUREG Bases markup p B 3.4-3, Insert Page B 3.4-3, Insert Page B 3.4-5, and Insert Page B 3.4-6 Retyped ITS Bases p B 3.4-3, B 3.4-4, B 3.4-7, and B 3.4-8

SUMMARY OF CHANGES TO ITS SECTION 3.4 - REVISION J

Source of Change	Summary of Change	Affected Pages
Editorial	The proper References have been provided for the ITS 3.4.3 Bases and the References have been placed in the proper order. The proper References have been provided for the ITS 3.4.9 Bases.	**Specification 3.4.3** NUREG Bases markup p B 3.4-13 and B 3.4-16 Retyped ITS Bases p B 3.4-15 and B 3.4-18 **Specification 3.4.9** NUREG Bases markup p Insert Page B 3.4-53 and B 3.4-54 Retyped ITS Bases p B 3.4-53 and B 3.4-54
Technical	The range of power generation that recirculation flow is varied to control reactor power without moving control rods has been modified to be consistent with the UFSAR.	**Specification 3.4.1** NUREG Bases markup p B 3.4-2 Retyped ITS Bases p B 3.4-2
Technical	The reactor vessel flange and head flange temperature surveillances in ITS 3.4.9 (SRs 3.4.9.6, 3.4.9.7, and 3.4.9.8) have been modified to exclude the 90 degree limit when the reactor vessel head bolting studs are not under tension. This is consistent with the CTS requirements.	**Specification 3.4.9** MUREG ITS markup p 3.4-25 and 3.4-26 JFD CLB1 (JFDs p 1 of 1) Retyped ITS Bases p 3.4-22 and 3.4-23

CLB1

Insert ACTION A

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or two recirculation loops in operation with core flow and THERMAL POWER conditions within the Exclusion Region of the power-to-flow map.	A.1 Initiate action to exit the Exclusion Region.	Immediately

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BACKGROUND (continued)

is transferred to the coolant. As it rises, the coolant begins to boil, creating steam voids within the fuel channel that continue until the coolant exits the core. Because of reduced moderation, the steam voiding introduces negative reactivity that must be compensated for to maintain or to increase reactor power. The recirculation flow control allows operators to increase recirculation flow and sweep some of the voids from the fuel channel, overcoming the negative reactivity void effect. Thus, the reason for having variable recirculation flow is to compensate for reactivity effects of boiling over a wide range of power generation (i.e., 55 to 100% of RTP) without having to move control rods and disturb desirable flux patterns.

Each recirculation loop is manually started from the control room. The MG set provides regulation of individual recirculation loop drive flows. The flow in each loop is manually controlled.

APPLICABLE SAFETY ANALYSES

The operation of the Reactor Coolant Recirculation System is an initial condition assumed in the design basis loss of coolant accident (LOCA) (Ref. 1). During a LOCA caused by a recirculation loop pipe break, the intact loop is assumed to provide coolant flow during the first few seconds of the accident. The initial core flow decrease is rapid because the recirculation pump in the broken loop ceases to pump reactor coolant to the vessel almost immediately. The pump in the intact loop coasts down relatively slowly. This pump coastdown governs the core flow response for the next several seconds until the jet pump suction is uncovered (Ref. 1). The analyses assume that both loops are operating at the same flow prior to the accident. However, the LOCA analysis was reviewed for the case with a flow mismatch between the two loops, with the pipe break assumed to be in the loop with the higher flow. While the flow coastdown and core response are potentially more severe in this assumed case (since the intact loop starts at a lower flow rate and the core response is the same as if both loops were operating at a lower flow rate), a small mismatch has been determined to be acceptable based on engineering judgement. The recirculation system is also assumed to have sufficient flow coastdown characteristics to maintain fuel thermal margins during abnormal operational transients (Ref. 2), which are analyzed in Chapter 15 of the FSAR.

(continued)

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APPLICABLE SAFETY ANALYSES (continued)

A plant specific LOCA analysis has been performed assuming only one operating recirculation loop. This analysis has demonstrated that, in the event of a LOCA caused by a pipe break in the operating recirculation loop, the Emergency Core Cooling System response will provide adequate core cooling, provided the APLHGR requirements are modified accordingly (Ref. 3).

The transient analyses of Chapter 15 of the FSAR have also been performed for single recirculation loop operation (Ref. 3) and demonstrate sufficient flow coastdown characteristics to maintain fuel thermal margins during the abnormal operational transients analyzed provided the MCPR requirements are modified. During single recirculation loop operation, modification to the Reactor Protection System (RPS) average power range monitor (APRM) instrument setpoints is also required to account for the different relationships between recirculation drive flow and reactor core flow. The APLHGR and MCPR setpoints for single loop operation are specified in the COLR. The APRM Flow-Biased Simulated THERMAL POWER setpoint is in LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation."

Recirculation loops operating satisfies Criterion 2 of the NRC Policy Statement.

LCO

Two recirculation loops are required to be in operation with their flows matched within the limits specified in SR 3.4.1.1 to ensure that during a LOCA caused by a break of the piping of one recirculation loop the assumptions of the LOCA analysis are satisfied. With the limits specified in SR 3.4.1.1 not met, the recirculation loop with the lower flow must be considered not in operation. With only one recirculation loop in operation, modifications to the required APLHGR limits (LCO 3.2.1, "AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)"), MCPR limits (LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)"), and APRM Flow Biased Simulated Thermal Power—High setpoint (LCO 3.3.1.1) may be applied to allow continued operation consistent with the assumptions of Reference 3.

(continued)

CLB1 Insert ASA

Operation of the Reactor Water Recirculation System also ensures adequate core flow at higher power levels such that conditions conducive to the onset of thermal hydraulic instability are avoided. The UFSAR Section 16.6 (Ref. 4) requires protection of fuel thermal safety limits from conditions caused by thermal hydraulic instability. Thermal hydraulic instabilities can result in power oscillations which could result in exceeding the MCPR Safety Limit. The MCPR Safety Limit is set such that 99.9% of the fuel rods avoid boiling transition if the limit is not violated (refer to the Bases for SL 2.1.1.2). Implementation of operability requirements for avoidance of, and protection from thermal-hydraulic instability, consistent with the BWR Owners' Group Long-Term Stability Solution Option I-D (Refs. 5 and 6) provides assurance that power oscillations are either prevented or can be readily detected and suppressed without exceeding the specified acceptable fuel design limits. To minimize the likelihood of thermal- hydraulic instability which results in power oscillations, a power-to-flow "Exclusion Region" is calculated using the approved methodology specified in Specification 5.6.5. The resulting "Exclusion Region" may change each fuel cycle and is therefore specified in the COLR. Entries into the "Exclusion Region" may occur as a result of an abnormal event, such as a single recirculation pump trip, loss of feedwater heating, or be required to prevent equipment damage.

The core-wide mode of oscillation in the neutron flux is more readily detected (and suppressed) than the regional mode of oscillation due to the spatial averaging of the Average Power Range Monitor (APRM). The Option I-D analysis for JAFNPP (Ref. 7) demonstrates that this protection is provided at a high statistical confidence level for regional mode oscillations. Reference 7 also demonstrates that the core-wide mode of oscillation is more likely to occur rather than regional oscillations due to the large single-phase pressure drop associated with the small fuel inlet orifice diameters.

PA3 Insert LCO

In addition, during two-loop and single-loop operation, the combination of core flow and THERMAL POWER must be outside the Exclusion Region of the power-to-flow map specified in the COLR to ensure core thermal-hydraulic instability does not occur.

X3

Insert SR 3.4.1.1

SR 3.4.1.1

This SR ensures the combination of core flow and THERMAL POWER are within appropriate limits to prevent uncontrolled thermal-hydraulic oscillations. At low recirculation flows and high reactor power, the reactor exhibits increased susceptibility to thermal-hydraulic instability. The power-to-flow map specified in the COLR is based on guidance provided in Reference 7. The 12 hour Frequency is based on operating experience and the operator's knowledge of the reactor status, including significant changes in THERMAL POWER and core flow.

This SR is modified by a Note that requires this Surveillance to be performed only in MODE 1 because the APRM Neutron Flux—High (Startup) Function in LCO 3.3.1.1 will prevent operation in the Exclusion Region while in MODE 2.

(DB2) Insert Ref

REFERENCES

3. NEDO-24281, FitzPatrick Nuclear Power Plant Single-Loop Operation, August 1980.

4. UFSAR, Section 16.6.

5. NEDO-31960-A, BWR Owners' Group Long Term Stability Solutions Licensing Methodology, June 1991.

6. NEDO-31960-A, Supplement 1, BWR Owners' Group Long-Term Stability Solutions Licensing Methodology, March 1992.

7. GENE-637-044-0295, Application Of The "Regional Exclusion With Flow-Biased APRM Neutron Flux Scram" Stability Solution (Option I-D) To The James A. FitzPatrick Nuclear Power Plant, February 1995.

8. 10 CFR 50.36(c)(2)(ii).

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.1 Recirculation Loops Operating

LCO 3.4.1 Two recirculation loops with matched flows shall be in operation and the reactor operating at core flow and THERMAL POWER conditions outside the Exclusion Region of the power-to-flow map specified in the COLR.

OR

One recirculation loop shall be in operation and the reactor operating at core flow and THERMAL POWER conditions outside the Exclusion Region of the power-to-flow map specified in the COLR with the following limits applied when the associated LCO is applicable:

a. LCO 3.2.1, "AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)," single loop operation limits specified in the COLR;

b. LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)," single loop operation limits specified in the COLR;

c. LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," Function 2.b (Average Power Range Monitors Neutron Flux-High (Flow Biased)), Allowable Value of Table 3.3.1.1-1 is reset for single loop operation; and

d. LCO 3.3.2.1, "Control Rod Block Instrumentation," Function 1.a (Rod Block Monitor-Upscale), Allowable Value of Table 3.3.2.1-1 is reset for single loop operation.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or two recirculation loops in operation with core flow and THERMAL POWER conditions within the Exclusion Region of the power-to-flow map.	A.1 Initiate action to exit the Exclusion Region.	Immediately
B. Requirements of the LCO not met for reasons other than Condition A.	B.1 Satisfy the requirements of the LCO.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met. OR No recirculation loops in operation.	C.1 Be in MODE 3.	12 hours

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BACKGROUND (continued)

is transferred to the coolant. As it rises, the coolant begins to boil, creating steam voids within the fuel channel that continue until the coolant exits the core. Because of reduced moderation, the steam voiding introduces negative reactivity that must be compensated for to maintain or to increase reactor power. The recirculation flow control allows operators to increase recirculation flow and sweep some of the voids from the fuel channel, overcoming the void negative reactivity effect. Thus, the reason for having variable recirculation flow is to compensate for reactivity effects of boiling over a wide range of power generation (i.e., 65% to 100% of RTP) without having to move control rods and disturb desirable flux patterns. The recirculation flow also provides sufficient core flow to ensure thermal-hydraulic stability of the core is maintained. | J

Each recirculation loop is manually started from the control room. The MG set provides regulation of individual recirculation loop drive flows. The flow in each loop is manually controlled.

APPLICABLE SAFETY ANALYSES

The operation of the Reactor Water Recirculation System is an initial condition assumed in the design basis loss of coolant accident (LOCA) (Ref. 1). During a LOCA caused by a recirculation loop pipe break, the intact loop is assumed to provide coolant flow during the first few seconds of the accident. The initial core flow decrease is rapid because the recirculation pump in the broken loop ceases to pump reactor coolant to the vessel almost immediately. The pump in the intact loop coasts down relatively slowly. This pump coastdown governs the core flow response for the next several seconds until the jet pump suction is uncovered (Ref. 1). The analyses assume that both loops are operating at the same flow prior to the accident. However, the LOCA analysis was reviewed for the case with a flow mismatch between the two loops, with the pipe break assumed to be in the loop with the higher flow. While the flow coastdown and core response are potentially more severe in this assumed case (since the intact loop starts at a lower flow rate and the core response is the same as if both loops were operating at a lower flow rate), a small mismatch has been determined to be acceptable based on engineering judgement. The recirculation system is also assumed to have sufficient flow coastdown characteristics to maintain fuel thermal | J

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