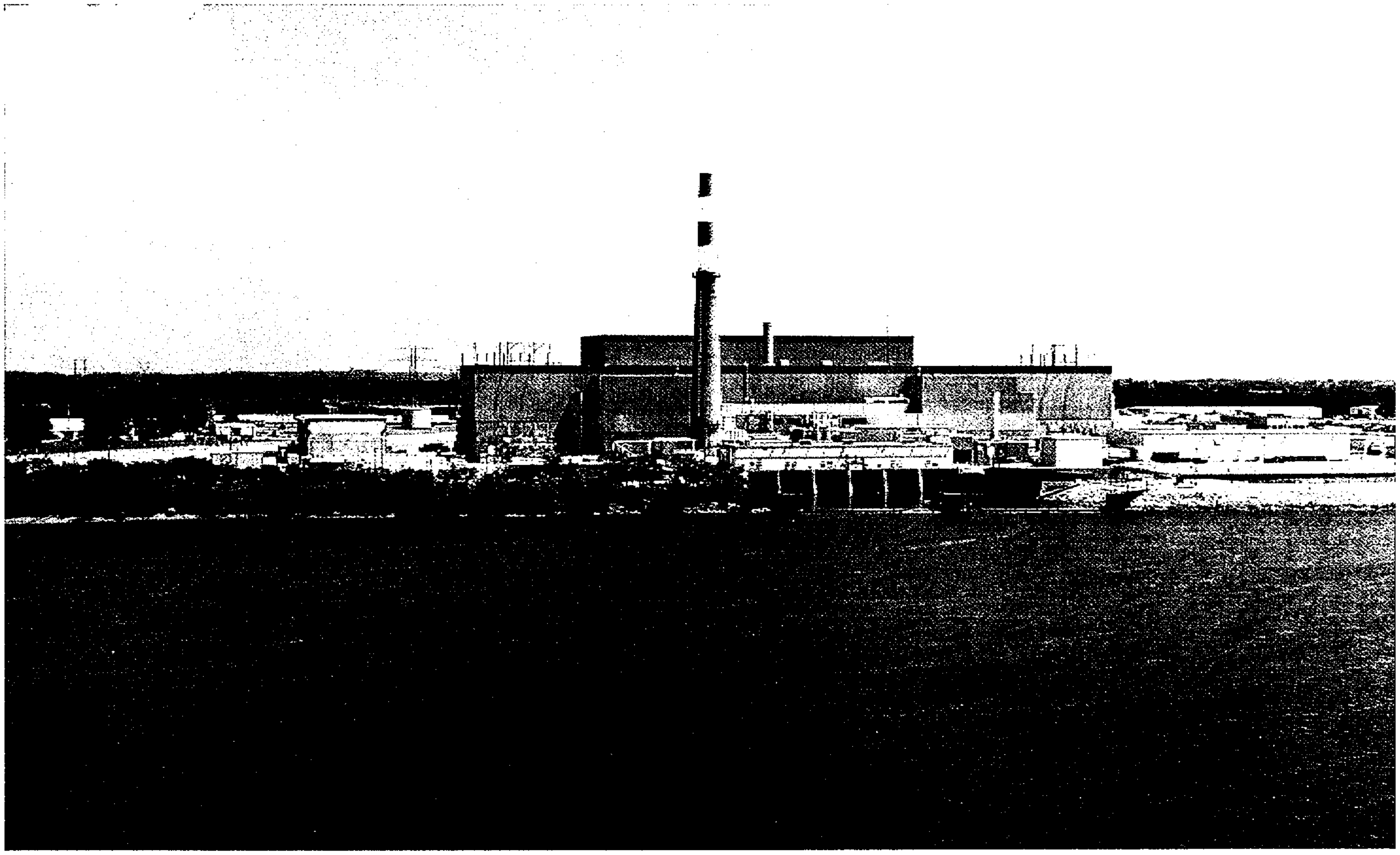
Improved Technical Specifications



Quad Cities Station

Volume 3:
Section 3.3; ITS, Bases and
CTS Makrup/DOC's

ComEd

3.3 INSTRUMENTATION

3.3.1.1 Reactor Protection System (RPS) Instrumentation

LCO 3.3.1.1 The RPS instrumentation for each Function in Table 3.3.1.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1.1-1.

ACTIONS

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

1. Separate Condition entry is allowed for each channel.

2. When Function 2.b and 2.c channels are inoperable due to APRM gain adjustment factor (GAF) not within limits, entry into associated Conditions and Required Actions may be delayed for up to 2 hours if the GAF is > 1.02, and for up to 12 hours if the GAF is < 0.98.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required channels inoperable.	A.1	Place channel in trip.	12 hours
	<u>OR</u>		
	A.2	Place associated trip system in trip.	12 hours
B. One or more Functions with one or more required channels inoperable in both trip systems.	B.1	Place channel in one trip system in trip.	6 hours
	<u>OR</u>		
	B.2	Place one trip system in trip.	6 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One or more Functions with RPS trip capability not maintained.	C.1	Restore RPS trip capability.	1 hour
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1	Enter the Condition referenced in Table 3.3.1.1-1 for the channel.	Immediately
E. As required by Required Action D.1 and referenced in Table 3.3.1.1-1.	E.1	Reduce THERMAL POWER to < 45% RTP.	4 hours
F. As required by Required Action D.1 and referenced in Table 3.3.1.1-1.	F.1	Be in MODE 2.	8 hours
G. As required by Required Action D.1 and referenced in Table 3.3.1.1-1.	G.1	Be in MODE 3.	12 hours
H. As required by Required Action D.1 and referenced in Table 3.3.1.1-1.	H.1	Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

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

1. Refer to Table 3.3.1.1-1 to determine which SRs apply for each RPS 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 RPS trip capability.

SURVEILLANCE		FREQUENCY
SR 3.3.1.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.1.1.2	-----------------NOTE----------------- Not required to be performed until 12 hours after THERMAL POWER ≥ 25% RTP. -------------------------------------- Verify the absolute difference between the average power range monitor (APRM) channels and the calculated power is ≤ 2% RTP plus any gain adjustment required by LCO 3.2.4, "Average Power Range Monitor (APRM) Gain and Setpoint" while operating at ≥ 25% RTP.	7 days
SR 3.3.1.1.3	Adjust the channel to conform to a calibrated flow signal.	7 days

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.1.1.4	-------------------NOTE------------------- Not required to be performed when entering MODE 2 from MODE 1 until 24 hours after entering MODE 2. -- Perform CHANNEL FUNCTIONAL TEST.	7 days
SR 3.3.1.1.5	Perform a functional test of each RPS automatic scram contactor.	7 days
SR 3.3.1.1.6	Verify the source range monitor (SRM) and intermediate range monitor (IRM) channels overlap.	Prior to fully withdrawing SRMs
SR 3.3.1.1.7	-------------------NOTE------------------- Only required to be met during entry into MODE 2 from MODE 1. -- Verify the IRM and APRM channels overlap.	7 days
SR 3.3.1.1.8	Perform CHANNEL FUNCTIONAL TEST.	31 days
SR 3.3.1.1.9	Calibrate the local power range monitors.	2000 effective full power hours
SR 3.3.1.1.10	Perform CHANNEL FUNCTIONAL TEST.	92 days

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.1.1.11	Calibrate the trip units.	92 days
SR 3.3.1.1.12	Perform CHANNEL CALIBRATION.	92 days
SR 3.3.1.1.13	Verify Turbine Stop Valve – Closure and Turbine Control Valve Fast Closure, Trip Oil Pressure – Low Functions are not bypassed when THERMAL POWER is ≥ 45% RTP.	92 days
SR 3.3.1.1.14	-------------------NOTES------------------- 1. Neutron detectors are excluded. 2. For Function 2.a, not required to be performed when entering MODE 2 from MODE 1 until 24 hours after entering MODE 2. 3. For Function 2.b, not required for the flow portion of the channels. --- Perform CHANNEL CALIBRATION.	184 days
SR 3.3.1.1.15	Perform CHANNEL FUNCTIONAL TEST.	24 months

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.1.1.16	-----------------NOTES----------------- 1. Neutron detectors are excluded. 2. For Function 1, not required to be performed when entering MODE 2 from MODE 1 until 24 hours after entering MODE 2. --------------------------------------- Perform CHANNEL CALIBRATION.	24 months
SR 3.3.1.1.17	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months
SR 3.3.1.1.18	-----------------NOTES----------------- 1. Neutron detectors are excluded. 2. For Function 5 "n" equals 4 channels for the purpose of determining the the STAGGERED TEST BASIS Frequency. --------------------------------------- Verify the RPS RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.1.1-1 (page 1 of 3)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Intermediate Range Monitors					
a. Neutron Flux – High	2	3	G	SR 3.3.1.1.1 SR 3.3.1.1.4 SR 3.3.1.1.5 SR 3.3.1.1.6 SR 3.3.1.1.7 SR 3.3.1.1.16 SR 3.3.1.1.17	[≤ 120/125 divisions of full scale]
	5(a)	3	H	SR 3.3.1.1.1 SR 3.3.1.1.4 SR 3.3.1.1.5 SR 3.3.1.1.16 SR 3.3.1.1.17	[≤ 120/125 divisions of full scale]
b. Inop	2	3	G	SR 3.3.1.1.4 SR 3.3.1.1.5 SR 3.3.1.1.17	NA
	5(a)	3	H	SR 3.3.1.1.4 SR 3.3.1.1.5 SR 3.3.1.1.17	NA
2. Average Power Range Monitors					
a. Neutron Flux – High, Setdown	2	2	G	SR 3.3.1.1.1 SR 3.3.1.1.4 SR 3.3.1.1.5 SR 3.3.1.1.7 SR 3.3.1.1.9 SR 3.3.1.1.14 SR 3.3.1.1.17	[≤ 15% RTP]
b. Flow Biased Neutron Flux – High	1	2	F	SR 3.3.1.1.1 SR 3.3.1.1.2 SR 3.3.1.1.3 SR 3.3.1.1.5 SR 3.3.1.1.9 SR 3.3.1.1.10 SR 3.3.1.1.14 SR 3.3.1.1.16 SR 3.3.1.1.17 SR 3.3.1.1.18	[≤ 0.58 W + 62% RTP and ≤ 120% RTP(b)]

(continued)

(a) With any control rod withdrawn from a core cell containing one or more fuel assemblies.

(b) 0.58 W + 58.5% and ≤ 116.5% RTP when reset for single loop operation per LCO 3.4.1, "Recirculation Loops Operating."

Table 3.3.1.1-1 (page 2 of 3)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. Average Power Range Monitors (continued)					
c. Fixed Neutron Flux – High	1	2	F	SR 3.3.1.1.1 SR 3.3.1.1.2 SR 3.3.1.1.5 SR 3.3.1.1.9 SR 3.3.1.1.10 SR 3.3.1.1.14 SR 3.3.1.1.17 SR 3.3.1.1.18	[≤ 120% RTP]
d. Inop	1,2	2	G	SR 3.3.1.1.5 SR 3.3.1.1.9 SR 3.3.1.1.10 SR 3.3.1.1.17	NA
3. Reactor Vessel Steam Dome Pressure – High	1,2	2	G	SR 3.3.1.1.1 SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.11 SR 3.3.1.1.16 SR 3.3.1.1.17 SR 3.3.1.1.18	[≤ 1060 psig]
4. Reactor Vessel Water Level – Low	1,2	2	G	SR 3.3.1.1.1 SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.11 SR 3.3.1.1.16 SR 3.3.1.1.17 SR 3.3.1.1.18	[≥ 144 inches]
5. Main Steam Isolation Valve – Closure	1	8	F	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.16 SR 3.3.1.1.17 SR 3.3.1.1.18	[≤ 10% closed]
6. Drywell Pressure – High	1,2	2	G	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.12 SR 3.3.1.1.17 SR 3.3.1.1.18	[≤ 2.5 psig]

(continued)

Table 3.3.1.1-1 (page 3 of 3)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
7. Scram Discharge Volume Water Level - High					
a. Thermal Switch	1,2	2	G	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.12 SR 3.3.1.1.17	[≤ 40 gallons]
	$5^{(a)}$	2	H	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.12 SR 3.3.1.1.17	[≤ 40 gallons]
b. Differential Pressure Switch	1,2	2	G	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.16 SR 3.3.1.1.17	[≤ 40 gallons]
	$5^{(a)}$	2	H	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.16 SR 3.3.1.1.17	[≤ 40 gallons]
8. Turbine Stop Valve - Closure	≥ 45% RTP	4	E	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.13 SR 3.3.1.1.16 SR 3.3.1.1.17 SR 3.3.1.1.18	[≤ 10% closed]
9. Turbine Control Valve Fast Closure, Trip Oil Pressure - Low	≥ 45% RTP	2	E	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.13 SR 3.3.1.1.16 SR 3.3.1.1.17 SR 3.3.1.1.18	[≥ 460 psig]
10. Turbine Condenser Vacuum - Low	1	2	F	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.12 SR 3.3.1.1.17 SR 3.3.1.1.18	[≥ 21 inches Hg vacuum]
11. Reactor Mode Switch - Shutdown Position	1,2	1	G	SR 3.3.1.1.15 SR 3.3.1.1.17	NA
	$5^{(a)}$	1	H	SR 3.3.1.1.15 SR 3.3.1.1.17	NA
12. Manual Scram	1,2	1	G	SR 3.3.1.1.8 SR 3.3.1.1.17	NA
	$5^{(a)}$	1	H	SR 3.3.1.1.8 SR 3.3.1.1.17	NA

(a) With any control rod withdrawn from a core cell containing one or more fuel assemblies.

3.3 INSTRUMENTATION

3.3.1.2 Source Range Monitor (SRM) Instrumentation

LCO 3.3.1.2 The SRM instrumentation in Table 3.3.1.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1.2-1.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required SRMs inoperable in MODE 2 with intermediate range monitors (IRMs) on Range 2 or below.	A.1	Restore required SRMs to OPERABLE status.	4 hours
B. Three required SRMs inoperable in MODE 2 with IRMs on Range 2 or below.	B.1	Suspend control rod withdrawal.	Immediately
C. Required Action and associated Completion Time of Condition A or B not met.	C.1	Be in MODE 3.	12 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. One or more required SRMs inoperable in MODE 3 or 4.	D.1	Fully insert all insertable control rods.	1 hour
	<u>AND</u>		
	D.2	Place reactor mode switch in the shutdown position.	1 hour
E. One or more required SRMs inoperable in MODE 5.	E.1	Suspend CORE ALTERATIONS except for control rod insertion.	Immediately
	<u>AND</u>		
	E.2	Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

-----------------------------------NOTE-----------------------------------
Refer to Table 3.3.1.2-1 to determine which SRs apply for each applicable MODE or other specified condition.

SURVEILLANCE		FREQUENCY
SR 3.3.1.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.1.2.2	-----------------NOTES----------------- 1. Only required to be met during CORE ALTERATIONS. 2. One SRM may be used to satisfy more than one of the following. --------------------------------------- Verify an OPERABLE SRM detector is located in: a. The fueled region; b. The core quadrant where CORE ALTERATIONS are being performed, when the associated SRM is included in the fueled region; and c. A core quadrant adjacent to where CORE ALTERATIONS are being performed, when the associated SRM is included in the fueled region.	12 hours
SR 3.3.1.2.3	Perform CHANNEL CHECK.	24 hours

(continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.3.1.2.4	------------------NOTE------------------ Not required to be met with less than or equal to four fuel assemblies adjacent to the SRM and no other fuel assemblies in the associated core quadrant. -- Verify count rate is: a. ≥ 3.0 cps; or b. ≥ 0.7 cps with a signal to noise ratio ≥ 20:1.	12 hours during CORE ALTERATIONS AND 24 hours
SR 3.3.1.2.5	------------------NOTE------------------ The determination of signal to noise ratio is not required to be met with less than or equal to four fuel assemblies adjacent to the SRM and no other fuel assemblies in the associated core quadrant. -- Perform CHANNEL FUNCTIONAL TEST and determination of signal to noise ratio.	7 days
SR 3.3.1.2.6	------------------NOTE------------------ Not required to be performed until 12 hours after IRMs on Range 2 or below. -- Perform CHANNEL FUNCTIONAL TEST and determination of signal to noise ratio.	31 days

(continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.3.1.2.7	------------------NOTES------------------ 1. Neutron detectors are excluded. 2. Not required to be performed until 12 hours after IRMs on Range 2 or below. --- Perform CHANNEL CALIBRATION.	24 months

Table 3.3.1.2-1 (page 1 of 1)
Source Range Monitor Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1. Source Range Monitor	2(a)	3	SR 3.3.1.2.1 SR 3.3.1.2.4 SR 3.3.1.2.6 SR 3.3.1.2.7
	3,4	2	SR 3.3.1.2.3 SR 3.3.1.2.4 SR 3.3.1.2.6 SR 3.3.1.2.7
	5	2(b)(c)	SR 3.3.1.2.1 SR 3.3.1.2.2 SR 3.3.1.2.4 SR 3.3.1.2.5 SR 3.3.1.2.7

(a) With IRMs on Range 2 or below.

(b) Only one SRM channel is required to be OPERABLE during spiral offload or reload when the fueled region includes only that SRM detector.

(c) Special movable detectors may be used in place of SRMs if connected to normal SRM circuits.

3.3 INSTRUMENTATION

3.3.2.1 Control Rod Block Instrumentation

LCO 3.3.2.1 The control rod block instrumentation for each Function in Table 3.3.2.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2.1-1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One rod block monitor (RBM) channel inoperable.	A.1 Restore RBM channel to OPERABLE status.	24 hours
B. Required Action and associated Completion Time of Condition A not met. <u>OR</u> Two RBM channels inoperable.	B.1 Place one RBM channel in trip.	1 hour
C. Rod worth minimizer (RWM) inoperable during reactor startup.	C.1 Suspend control rod movement except by scram. <u>OR</u>	Immediately (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2.1.1 Verify ≥ 12 rods withdrawn. OR C.2.1.2 Verify by administrative methods that startup with RWM inoperable has not been performed in the last calendar year.	Immediately Immediately
	AND C.2.2 Verify movement of control rods is in compliance with the analyzed rod position sequence by a second licensed operator or other qualified member of the technical staff.	During control rod movement
D. RWM inoperable during reactor shutdown.	D.1 Verify movement of control rods is in compliance with analyzed rod position sequence by a second licensed operator or other qualified member of the technical staff.	During control rod movement

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One or more Reactor Mode Switch - Shutdown Position channels inoperable.	E.1 Suspend control rod withdrawal.	Immediately
	<u>AND</u>	
	E.2 Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

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

1. Refer to Table 3.3.2.1-1 to determine which SRs apply for each Control Rod Block Function.

2. When an RBM 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 control rod block capability.

SURVEILLANCE		FREQUENCY
SR 3.3.2.1.1	Perform CHANNEL FUNCTIONAL TEST.	92 days

(continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.3.2.1.2	-----NOTE----- Not required to be performed until 1 hour after any control rod is withdrawn at ≤ 10% RTP in MODE 2. ---------- Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.2.1.3	-----NOTE----- Not required to be performed until 1 hour after THERMAL POWER is ≤ 10% RTP in MODE 1. ---------- Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.2.1.4	-----NOTE----- Neutron detectors are excluded. ---------- Perform CHANNEL CALIBRATION.	92 days
SR 3.3.2.1.5	-----NOTE----- Neutron detectors are excluded. ---------- Verify the RBM is not bypassed when THERMAL POWER is ≥ 30% and when a peripheral control rod is not selected.	24 months
SR 3.3.2.1.6	Verify the RWM is not bypassed when THERMAL POWER is ≤ 10% RTP.	24 months

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.2.1.7	----------------NOTE---------------- Not required to be performed until 1 hour after reactor mode switch is in the shutdown position. ------------------------------------ Perform CHANNEL FUNCTIONAL TEST.	24 months
SR 3.3.2.1.8	Verify control rod sequences input to the RWM are in conformance with analyzed rod position sequence.	Prior to declaring RWM OPERABLE following loading of sequence into RWM
SR 3.3.2.1.9	Verify the bypassing and position of control rods required to be bypassed in RWM by a second licensed operator or other qualified member of the technical staff.	Prior to and during the movement of control rods bypassed in RWM

Table 3.3.2.1-1 (page 1 of 1)
Control Rod Block Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Rod Block Monitor				
a. Upscale	(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.5	As specified in the COLR
b. Inop	(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.5	NA
c. Downscale	(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.5	[≥ 3/125] divisions of full scale
2. Rod Worth Minimizer	$1^{(b)}, 2^{(b)}$	1	SR 3.3.2.1.2 SR 3.3.2.1.3 SR 3.3.2.1.6 SR 3.3.2.1.8 SR 3.3.2.1.9	NA
3. Reactor Mode Switch – Shutdown Position	(c)	2	SR 3.3.2.1.7	NA

(a) THERMAL POWER ≥ 30% RTP and no peripheral control rod selected.

(b) With THERMAL POWER ≤ 10% RTP.

(c) Reactor mode switch in the shutdown position.

3.3 INSTRUMENTATION

3.3.2.2 Feedwater System and Main Turbine High Water Level Trip Instrumentation

LCO 3.3.2.2 Two channels of Feedwater System and main turbine high water level trip instrumentation shall be OPERABLE.

APPLICABILITY: THERMAL POWER $\geq$ 25% RTP.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Feedwater System and main turbine high water level trip channels inoperable.	A.1	Restore Feedwater System and main turbine high water level trip capability.	2 hours
B. Required Action and associated Completion Time not met.	B.1	---------NOTE-------- Only applicable if inoperable channel is the result of an inoperable feedwater pump breaker. --------------------- Remove affected feedwater pump(s) from service.	4 hours
	<u>OR</u>		
		Reduce THERMAL POWER to < 25% RTP.	4 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 2 hours.

SURVEILLANCE		FREQUENCY
SR 3.3.2.2.1	Perform CHANNEL CHECK.	24 hours
SR 3.3.2.2.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.2.2.3	Perform CHANNEL CALIBRATION. The Allowable Value shall be $\leq$ [201] inches.	92 days
SR 3.3.2.2.4	Perform LOGIC SYSTEM FUNCTIONAL TEST, including breaker and valve actuation.	24 months

3.3 INSTRUMENTATION

3.3.3.1 Post Accident Monitoring (PAM) Instrumentation

LCO 3.3.3.1 The PAM instrumentation for each Function in Table 3.3.3.1-1 shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

NOTES

1. LCO 3.0.4 is not applicable.

2. Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one required channel inoperable.	A.1 Restore required channel to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action in accordance with Specification 5.6.6.	Immediately
C. One or more Functions with two required channels inoperable.	C.1 Restore one required channel to OPERABLE status.	7 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met.	D.1 Enter the Condition referenced in Table 3.3.3.1-1 for the channel.	Immediately
E. As required by Required Action D.1 and referenced in Table 3.3.3.1-1.	E.1 Be in MODE 3.	12 hours
F. As required by Required Action D.1 and referenced in Table 3.3.3.1-1.	F.1 Initiate action in accordance with Specification 5.6.6.	Immediately

SURVEILLANCE REQUIREMENTS

NOTES

6. These SRs apply to each Function in Table 3.3.3.1-1, except where identified in the SR.

7. 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 other required channel in the associated Function is OPERABLE.

SURVEILLANCE		FREQUENCY
SR 3.3.3.1.1	Perform CHANNEL CHECK.	31 days
SR 3.3.3.1.2	Perform CHANNEL CALIBRATION for Functions 7 and 8.	92 days
SR 3.3.3.1.3	Perform CHANNEL CALIBRATION for Functions other than Functions 7 and 8.	24 months

Table 3.3.3.1-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1
1. Reactor Vessel Pressure	2	E
2. Reactor Vessel Water Level		
a. Wide Range	2	E
b. Narrow Range	2	E
3. Torus Water Level	2	E
4. Drywell Pressure		
a. Wide Range	2	E
b. Narrow Range	2	E
5. Drywell Radiation Monitors	2	F
6. Penetration Flow Path PCIV Position	2 per penetration flow path[(a)(b)]	E
7. Drywell H_2 Concentration Analyzer and Monitor	2	E
8. Drywell O_2 Concentration Analyzer and Monitor	2	E
9. Torus Water Temperature	2	E

(a) Not required for isolation valves whose associated penetration flow path is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

3.3 INSTRUMENTATION

3.3.4.1 Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) Instrumentation

LCO 3.3.4.1 Two channels per trip system for each ATWS-RPT instrumentation Function listed below shall be OPERABLE:

a. Reactor Vessel Water Level — Low Low; and

b. Reactor Vessel Steam Dome Pressure — High.

APPLICABILITY: MODE 1.

ACTIONS

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

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more channels inoperable.	A.1	Restore channel to OPERABLE status.	14 days
	<u>OR</u>		
	A.2	--------NOTE--------- Not applicable if inoperable channel is the result of an inoperable breaker. --------------------- Place channel in trip.	14 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One Function with ATWS-RPT trip capability not maintained.	B.1	Restore ATWS-RPT trip capability.	72 hours
C. Both Functions with ATWS-RPT trip capability not maintained.	C.1	Restore ATWS-RPT trip capability for one Function.	1 hour
D. Required Action and associated Completion Time not met.	D.1	Remove the associated recirculation pump from service.	6 hours
	<u>OR</u>		
	D.2	Be in MODE 2.	6 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 ATWS-RPT trip capability.

SURVEILLANCE		FREQUENCY
SR 3.3.4.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.4.1.2	Calibrate the trip units.	31 days
SR 3.3.4.1.3	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.4.1.4	Perform CHANNEL CALIBRATION. The Allowable Values shall be: a. Reactor Vessel Water Level — Low Low ≥ [84] inches with time delay set to ≥ [8] seconds and ≤ [10] seconds; and b. Reactor Vessel Steam Dome Pressure — High: ≤ [1250] psig.	24 months
SR 3.3.4.1.5	Perform LOGIC SYSTEM FUNCTIONAL TEST including breaker actuation.	24 months

3.3 INSTRUMENTATION

3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

LCO 3.3.5.1 The ECCS instrumentation for each Function in Table 3.3.5.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.5.1-1.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5.1-1 for the channel.	Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	B.1	--------NOTES-------- 1. Only applicable in MODES 1, 2, and 3. 2. Only applicable for Functions 1.a, 1.b, 2.a, 2.b, 2.d and 2.j. ---------------------	
		Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.	1 hour from discovery of loss of initiation capability for feature(s) in both divisions
	AND		
	B.2	--------NOTE--------- Only applicable for Functions 3.a and 3.b. ---------------------	
		Declare High Pressure Coolant Injection (HPCI) System inoperable.	1 hour from discovery of loss of HPCI initiation capability
	AND		
	B.3	Place channel in trip.	24 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	C.1	--------NOTES-------- 1. Only applicable in MODES 1, 2, and 3. 2. Only applicable for Functions 1.c, 1.e, 2.c, 2.e, 2.g, 2.h, 2.i, and 2.k. ---------------------	
		Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.	1 hour from discovery of loss of initiation capability for feature(s) in both divisions
	<u>AND</u>		
	C.2	Restore channel to OPERABLE status.	24 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	D.1 --------NOTE-------- Only applicable if HPCI pump suction is not aligned to the suppression pool. -------------------- Declare HPCI System inoperable.	1 hour from discovery of loss of HPCI initiation capability
	AND	
	D.2.1 Place channel in trip.	24 hours
	OR	
	D.2.2 Align the HPCI pump suction to the suppression pool.	24 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	E.1	--------NOTES-------- 1. Only applicable in MODES 1, 2, and 3. 2. Only applicable for Functions 1.d and 2.f. --------------------- Declare supported feature(s) inoperable when its redundant feature ECCS initiation capability is inoperable.	1 hour from discovery of loss of initiation capability for subsystems in both divisions
	<u>AND</u>		
	E.2	Restore channel to OPERABLE status.	7 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	F.1 Declare Automatic Depressurization System (ADS) valves inoperable.	1 hour from discovery of loss of ADS initiation capability in both trip systems
	<u>AND</u>	
	F.2 Place channel in trip.	96 hours from discovery of inoperable channel concurrent with HPCI or reactor core isolation cooling (RCIC) inoperable <u>AND</u> 8 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. As required by Required Action A.1 and referenced in Table 3.3.5.1-1.	G.1	Declare ADS valves inoperable.	1 hour from discovery of loss of ADS initiation capability in both trip systems
	<u>AND</u>		
	G.2	Restore channel to OPERABLE status.	96 hours from discovery of inoperable channel concurrent with HPCI or RCIC inoperable <u>AND</u> 8 days
H. Required Action and associated Completion Time of Condition B, C, D, E, F, or G not met.	H.1	Declare associated supported feature(s) inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

-----NOTES-----

1. Refer to Table 3.3.5.1-1 to determine which SRs apply for each ECCS 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 3.c, 3.f, and 3.g; and (b) for up to 6 hours for Functions other than 3.c, 3.f, and 3.g provided the associated Function or the redundant Function maintains ECCS initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.5.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.5.1.2	Perform CHANNEL FUNCTIONAL TEST.	31 days
SR 3.3.5.1.3	Perform CHANNEL CALIBRATION.	60 days
SR 3.3.5.1.4	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.5.1.5	Calibrate the trip unit.	92 days
SR 3.3.5.1.6	Perform CHANNEL CALIBRATION.	92 days
SR 3.3.5.1.7	Perform CHANNEL CALIBRATION.	24 months

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.3.5.1.8 Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

Table 3.3.5.1-1 (page 1 of 4
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Core Spray System					
a. Reactor Vessel Water Level - Low Low	1,2,3, 4(a), 5(a)	4(b)	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.8	[≥ 84 inches]
b. Drywell Pressure - High	1,2,3	4(b)	B	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≤ 2.5 psig]
c. Reactor Steam Dome Pressure - Low (Permissive)	1,2,3	2	C	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≥ 300 psig and ≤ 350 psig]
	4(a), 5(a)	2	B	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≥ 300 psig and ≤ 350 psig]
d. Core Spray Pump Discharge Flow - Low (Bypass)	1,2,3, 4(a), 5(a)	1 per pump	E	SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.7 SR 3.3.5.1.8	[≥ 500 gpm and ≤ 874 gpm]
e. Core Spray Pump Start-Time Delay Relay	1, 2, 3 4(a), 5(a)	1 per pump	C	SR 3.3.5.1.7 SR 3.3.5.1.8	[≤ 10 seconds]
2. Low Pressure Coolant Injection (LPCI) System					
a. Reactor Vessel Water Level - Low Low	1,2,3, 4(a), 5(a)	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.8	[≥ 84 inches]
b. Drywell Pressure - High	1,2,3	4	B	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≤ 2.5 psig]
c. Reactor Steam Dome Pressure - Low (Permissive)	1,2,3	2	C	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≥ 300 psig and ≤ 350 psig]
	4(a), 5(a)	2	B	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≥ 300 psig and ≤ 350 psig]

(continued)

(a) When associated ECCS subsystem(s) are required to be OPERABLE per LCO 3.5.2, "ECCS - Shutdown."

(b) Also required to initiate the associated diesel generator (DG).

Table 3.3.5.1-1 (page 2 of 4)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI System (continued)					
d. Reactor Steam Dome Pressure – Low (Break Detection)	1,2,3	4	B	SR 3.3.5.1.4 SR 3.3.5.1.7 SR 3.3.5.1.8	[≥ 900 psig]
e. Low Pressure Coolant Injection Pump Start – Time Delay Relay Pumps B and D	1,2,3, $4^{(a)}$, $5^{(a)}$	1 per pump	C	SR 3.3.5.1.7 SR 3.3.5.1.8	[≤ 5 seconds]
f. Low Pressure Coolant Injection Pump Discharge Flow – Low (Bypass)	1,2,3, $4^{(a)}$, $5^{(a)}$	1 per loop	E	SR 3.3.5.1.4 SR 3.3.5.1.5 SR 3.3.5.1.7 SR 3.3.5.1.8	[≥ 2400 gpm]
g. Recirculation Pump Differential Pressure-High (Break Detection)	1, 2, 3	4 per pump	C	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≤ 1.927 psid]
h. Recirculation Riser Differential Pressure-High (Break Detection)	1, 2, 3	4	C	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≤ 1.0 psid]
i. Recirculation Pump Differential Pressure Time Delay - Relay (Break Detection)	1, 2, 3	2	C	SR 3.3.5.1.7 SR 3.3.5.1.8	[≤ 1.0 seconds]
j. Reactor Steam Dome Pressure Time Delay - Relay (Break Detection)	1, 2, 3	2	B	SR 3.3.5.1.7 SR 3.3.5.1.8	[≤ 2.25 seconds]
k. Recirculation Riser Differential Pressure Time Delay - Relay (Break Detection)	1, 2, 3	2	C	SR 3.3.5.1.7 SR 3.3.5.1.8	[≤ 1.0 seconds]

(continued)

(a) When associated ECCS subsystem(s) are required to be OPERABLE per LCO 3.5.2.

Table 3.3.5.1-1 (page 3 of 4
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. High Pressure Coolant Injection (HPCI) System					
a. Reactor Vessel Water Level - Low Low	1, $2^{(c)}$, $3^{(c)}$	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.8	[≥ 84 inches]
b. Drywell Pressure - High	1, $2^{(c)}$,$3^{(c)}$	4	B	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≤ 2.5 psig]
c. Reactor Vessel Water Level - High	1, $2^{(c)}$, $3^{(c)}$	2	C	SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.8	[≤ 201 inches]
d. Contaminated Condensate Storage Tank (CCST) Level - Low	1, $2^{(c)}$, $3^{(c)}$	2	D	SR 3.3.5.1.4 SR 3.3.5.1.7 SR 3.3.5.1.8	[≥ 10,000 gallons]
e. Suppression Pool Water Level - High	1, $2^{(c)}$, $3^{(c)}$	2	D	SR 3.3.5.1.4 SR 3.3.5.1.8	[≤ 14 ft 8 inches]
f. High Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)	1, $2^{(c)}$, $3^{(c)}$	1	E	SR 3.3.5.1.4 SR 3.3.5.1.7 SR 3.3.5.1.8	[≥ 600 gpm]
g. Manual Initiation	1, $2^{(c)}$, $3^{(c)}$	1	C	SR 3.3.5.1.8	NA
4. Automatic Depressurization System (ADS) Trip System A					
a. Reactor Vessel Water Level - Low Low	1, $2^{(c)}$, $3^{(c)}$	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.8	[≥ 84 inches]
b. Drywell Pressure - High	1, $2^{(c)}$, $3^{(c)}$	2	F	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≤ 2.5 psig]
c. Automatic Depressurization System Initiation Timer	1, $2^{(c)}$, $3^{(c)}$	1	G	SR 3.3.5.1.7 SR 3.3.5.1.8	[≤ 120 seconds]

(continued)

(c) With reactor steam dome pressure > 150 psig.

Table 3.3.5.1-1 (page 4 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. ADS Trip System A (continued)					
d. Core Spray Pump Discharge Pressure - High	1, $2^{(c)}$, $3^{(c)}$	2	G	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≥ 100 psig and ≤ 150 psig]
e. Low Pressure Coolant Injection Pump Discharge Pressure - High	1, $2^{(c)}$, $3^{(c)}$	4	G	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≥ 100 psig and ≤ 150 psig]
f. Automatic Depressurization System Low Low Water Level Actuation Timer	1, $2^{(c)}$, $3^{(c)}$	1	G	SR 3.3.5.1.7 SR 3.3.5.1.8	[≤ 9 minutes]
5. ADS Trip System B					
a. Reactor Vessel Water Level - Low Low	1, $2^{(c)}$, $3^{(c)}$	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.8	[≥ 84 inches]
b. Drywell Pressure - High	1, $2^{(c)}$, $3^{(c)}$	2	F	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≤ 2.5 psig]
c. Automatic Depressurization System Initiation Timer	1, $2^{(c)}$, $3^{(c)}$	1	G	SR 3.3.5.1.7 SR 3.3.5.1.8	[≤ 120 seconds]
d. Core Spray Pump Discharge Pressure - High	1, $2^{(c)}$, $3^{(c)}$	2	G	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≥ 100 psig and ≤ 150 psig]
e. Low Pressure Coolant Injection Pump Discharge Pressure - High	1, $2^{(c)}$, $3^{(c)}$	4	G	SR 3.3.5.1.4 SR 3.3.5.1.6 SR 3.3.5.1.8	[≥ 100 psig and ≤ 150 psig]
f. Automatic Depressurization System Low Low Water Level Actuation Timer	1, $2^{(c)}$, $3^{(c)}$	1	G	SR 3.3.5.1.7 SR 3.3.5.1.8	[≤ 9 minutes]

(c) With reactor steam dome pressure > 150 psig.

3.3 INSTRUMENTATION

3.3.5.2 Reactor Core Isolation Cooling (RCIC) System Instrumentation

LCO 3.3.5.2 The RCIC System instrumentation for each Function in Table 3.3.5.2-1 shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3 with reactor steam dome pressure > 150 psig.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5.2-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	B.1 Declare RCIC System inoperable.	1 hour from discovery of loss of RCIC initiation capability
	<u>AND</u>	
	B.2 Place channel in trip.	24 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	C.1	Restore channel to OPERABLE status.	24 hours
D. As required by Required Action A.1 and referenced in Table 3.3.5.2-1.	D.1	--------NOTE--------- Only applicable if RCIC pump suction is not aligned to the suppression pool. --------------------- Declare RCIC System inoperable.	1 hour from discovery of loss of RCIC initiation capability
	<u>AND</u>		
	D.2.1	Place channel in trip.	24 hours
	<u>OR</u>		
	D.2.2	Align RCIC pump suction to the suppression pool.	24 hours
E. Required Action and associated Completion Time of Condition B, C, or D not met.	E.1	Declare RCIC System inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

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

1. Refer to Table 3.3.5.2-1 to determine which SRs apply for each RCIC 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 and 5; and (b) for up to 6 hours for Functions 1, 3, and 4 provided the associated Function maintains RCIC initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.5.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.5.2.2	Perform CHANNEL FUNCTIONAL TEST.	31 days
SR 3.3.5.2.3	Perform CHANNEL CALIBRATION.	60 days
SR 3.3.5.2.4	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.5.2.5	Perform CHANNEL CALIBRATION.	24 months
SR 3.3.5.2.6	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

Table 3.3.5.2-1 (page 1 of 1)
Reactor Core Isolation Cooling System Instrumentation

FUNCTION	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level – Low Low	4	B	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3 SR 3.3.5.2.6	[≥ 84 inches]
2. Reactor Vessel Water Level – High	2	C	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3 SR 3.3.5.2.6	[≤ 201 inches]
3. Contaminated Condensate Storage Tank (CCST) Level – Low	2	D	SR 3.3.5.2.4 SR 3.3.5.2.5 SR 3.3.5.2.6	[≥ 598 ft El.]
4. Suppression Pool Water Level – High	2	D	SR 3.3.5.2.4 SR 3.3.5.2.6	[≤ 14 ft 8 inches]
5. Manual Initiation	1	C	SR 3.3.5.2.6	NA

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

------------------------------------NOTE------------------------------------
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 1.a, 2.a, 2.b, 3.d, 5.b and 6.b <u>AND</u> 24 hours for Functions other than Functions 1.a, 2.a, 2.b, 3.d, 5.b and 6.b
B. One or more automatic Functions with isolation capability not maintained.	B.1 Restore isolation capability.	1 hour

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Enter the Condition referenced in Table 3.3.6.1-1 for the channel.	Immediately
D. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	D.1 Isolate associated main steam line (MSL). <u>OR</u> D.2.1 Be in MODE 3. <u>AND</u> D.2.2 Be in MODE 4.	12 hours 12 hours 36 hours
E. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	E.1 Be in MODE 2.	8 hours
F. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	F.1 Isolate the affected penetration flow path(s).	1 hour

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Required Action and associated Completion Time for Condition F not met. OR As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	G.1 Be in MODE 3. AND G.2 Be in MODE 4.	12 hours 36 hours
H. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	H.1 Declare associated standby liquid control subsystem (SLC) inoperable. OR H.2 Isolate the Reactor Water Cleanup System.	1 hour 1 hour
I. As required by Required Action C.1 and referenced in Table 3.3.6.1-1.	I.1 Initiate action to restore channel to OPERABLE status. OR I.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 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.	92 days
SR 3.3.6.1.3	Calibrate the trip unit.	92 days
SR 3.3.6.1.4	Perform CHANNEL CALIBRATION.	92 days
SR 3.3.6.1.5	Perform CHANNEL CALIBRATION.	24 months
SR 3.3.6.1.6	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

Table 3.3.6.1-1 (page 1 of 3)
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
1. Main Steam Line Isolation					
a. Reactor Vessel Water Level – Low Low	1,2,3	2	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	[≥ 84 inches]
b. Main Steam Line Pressure – Low	1	2	E	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	[≥ 825 psig]
c. Main Steam Line Pressure – Timer	1	2	E	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	[≥ 0.1 seconds and ≤ 0.5 seconds]
d. Main Steam Line Flow – High	1,2,3	2 per MSL	D	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	[≤ 140% rated steam flow]
e. Main Steam Line Tunnel Temperature – High	1,2,3	2 per trip string	D	SR 3.3.6.1.5 SR 3.3.6.1.6	[≤ 200°F]
2. Primary Containment Isolation					
a. Reactor Vessel Water Level – Low	1,2,3	2	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	[≥ 144 inches]
b. Drywell Pressure – High	1,2,3	2	G	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	[≤ 2.5 psig]
c. Drywell Radiation – High	1,2,3	1	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	[≤ 100 R/hr]

(continued)

Table 3.3.6.1-1 (page 2 of 3)
Primary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIEC CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCEC FROM REQUIRED ACTION C.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. High Pressure Coolant Injection (HPCI) System Isolation					
a. HPCI Steam Line Flow – High	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	[≤ 300% rated steam flow]
b. HPCI Steam Line Flow – Timer	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	[≥ 3 seconds and ≤ 9 seconds]
c. HPCI Steam Supply Line Pressure - Low	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	[≥ 100 psig]
d. Drywell Pressure – High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	[≤ 2.5 psig]
e. HPCI Turbine Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.5 SR 3.3.6.1.6	[≤ 170°F]
4. Reactor Core Isolation Cooling (RCIC) System Isolation					
a. RCIC Steam Line Flow – High	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	[≤ 300% rated steam flow]
b. RCIC Steam Line Flow – Timer	1,2,3	1	F	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	[≥ 3 seconds and ≤ 9 seconds]
c. RCIC Steam Supply Line Pressure – Low	1,2,3	4(a)	F	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	[≥ 60 psig]
d. RCIC Turbine Area Temperature - High	1,2,3	2	F	SR 3.3.6.1.5 SR 3.3.6.1.6	[≤ 170°F]

(continued)

(a) Only inputs into one trip system.

Table 3.3.6.1-1 (page 3 of 3)
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
5. Reactor Water Cleanup System Isolation					
a. SLC System Initiation	1,2	1	H	SR 3.3.6.1.6	NA
b. Reactor Vessel Water Level - Low	1,2,3	2	F	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	[≥ 144 inches]
6. RHR Shutdown Cooling System Isolation					
a. Reactor Vessel Pressure - High	1,2,3	2	F	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	[≤ 135 psig]
b. Reactor Vessel Water Level - Low	3,4,5	2(b)	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	[≥ 144 inches]

(b) In MODES 4 and 5, provided RHR Shutdown Cooling System integrity is maintained, only one channel per trip system with an isolation signal available to one shutdown cooling pump suction isolation valve is required.

3.3 INSTRUMENTATION

3.3.6.2 Secondary Containment Isolation Instrumentation

LCO 3.3.6.2 The secondary containment isolation instrumentation for each Function in Table 3.3.6.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.6.2-1.

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.	12 hours for Functions 1 and 2 <u>AND</u> 24 hours for Functions other than Functions 1 and 2
B. One or more Functions with isolation capability not maintained.	B.1 Restore isolation capability.	1 hour

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time not met.	C.1.1 Isolate the associated penetration flow path. _OR_	1 hour
	C.1.2 Declare associated secondary containment isolation valves inoperable. _AND_	1 hour
	C.2.1 Place the associated standby gas treatment (SGT) subsystem in operation. _OR_	1 hour
	C.2.2 Declare associated SGT subsystem inoperable.	1 hour

SURVEILLANCE REQUIREMENTS

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

1. Refer to Table 3.3.6.2-1 to determine which SRs apply for each Secondary 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 for up to 6 hours provided the associated Function maintains isolation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.6.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.2.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.6.2.3	Calibrate the trip unit.	92 days
SR 3.3.6.2.4	Perform CHANNEL CALIBRATION.	92 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

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	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	[≥ 144 inches]
2. Drywell Pressure - High	1,2,3	2	SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.6	[≤ 2.5 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 3.3.6.2.4 SR 3.3.6.2.6	[≤ 10 mR/hr]
4. Refueling Floor 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	[≤ 100 mR/hr]

(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.

3.3 INSTRUMENTATION

3.3.6.3 Relief Valve Instrumentation

LCO 3.3.6.3 The relief valve instrumentation for each Function in Table 3.3.6.3-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One relief valve inoperable due to inoperable channel(s).	A.1	Restore channel(s) to OPERABLE status.	14 days
B. Required Action and associated Completion Time of Condition A not met. OR Two or more relief valves inoperable due to inoperable channels.	B.1	Be in MODE 3.	12 hours
	AND		
	B.2	Be in MODE 4.	36 hours

SURVEILLANCE REQUIREMENTS

-----NOTE-----
Refer to Table 3.3.6.3-1 to determine which SRs apply for each Function.

SURVEILLANCE	FREQUENCY
SR 3.3.6.3.1 Perform CHANNEL CALIBRATION.	24 months
SR 3.3.6.3.2 Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

Table 3.3.6.3-1 (page 1 of 1)
Relief Valve Set Instrumentation

FUNCTION	REQUIRED CHANNELS PER FUNCTION	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Low Set Relief Valves			
a. Reactor Vessel Pressure Setpoint	1 per valve	SR 3.3.6.3.1 SR 3.3.6.3.2	[≤ 1115 psig]
b. Reactuation Time Delay	2 per valve	SR 3.3.6.3.1 SR 3.3.6.3.2	[≥ 10 seconds and ≤ 16.5 seconds]
2. Relief Valves			
a. Reactor Vessel Pressure Setpoint	1 per valve	SR 3.3.6.3.1 SR 3.3.6.3.2	≤ [1135] psig

3.3 INSTRUMENTATION

3.3.7.1 Control Room Emergency Ventilation (CREV) System Isolation Instrumentation

LCO 3.3.7.1 The CREV System isolation instrumentation for each Function in Table 3.3.7.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.7.1-1.

ACTIONS

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

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required channels inoperable.	A.1	Enter the Condition referenced in Table 3.3.7.1-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table 3.3.7.1-1.	B.1.	Declare CREV System inoperable.	1 hour from discovery of loss of CREV System isolation capability
	<u>AND</u>		
	B.2	Place channel in trip.	24 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. As required by Required Action A.1 and referenced in Table 3.3.7.1-1.	C.1	Declare CREV System inoperable.	1 hour from discovery of loss of CREV System isolation capability in both trip systems
	<u>AND</u>		
	C.2	Place channel in trip.	12 hours
D. Required Action and associated Completion Time of Condition B or C not met.	D.1	Isolate each required control room penetration flow path.	1 hour
	<u>OR</u>		
	D.2	--------NOTE--------- Only applicable to Function 3 channels. --------------------- Isolate associated main steam line (MSL).	1 hour
	<u>OR</u>		
	D.3	Declare CREV System inoperable.	1 hour

SURVEILLANCE REQUIREMENTS

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

1. Refer to Table 3.3.7.1-1 to determine which SRs apply for each CREV System 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 for up to 6 hours provided the associated Function maintains CREV System isolation 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.	92 days
SR 3.3.7.1.5	Perform CHANNEL CALIBRATION.	24 months
SR 3.3.7.1.6	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

Table 3.3.7.1-1 (page 1 of 1)
Control Room Emergency Ventilation (CREV) System Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIREC ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level - Low	1,2,3, (a)	2	C	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.3 SR 3.3.7.1.5 SR 3.3.7.1.6	[≥ 144 inches]
2. Drywell Pressure - High	1,2,3	2	C	SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.6	[≤ 2.5 psig]
3. Main Steam Line Flow - High	1,2,3	2 per MSL	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.5 SR 3.3.7.1.6	[≤ 140% rated steam flow]
4. Refueling Floor Radiation - High	1,2,3, (a),(b)	2	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.6	[≤ 100 mR/hr]
5. Reactor Building Ventilation Exhaust Radiation - High	1,2,3, (a),(b)	2	B	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.4 SR 3.3.7.1.6	[≤ 10 mR/hr]

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

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

3.3 INSTRUMENTATION

3.3.7.2 Mechanical Vacuum Pump Trip Instrumentation

LCO 3.3.7.2 Four channels of Main Steam Line Radiation – High Function for the mechanical vacuum pump trip shall be OPERABLE.

APPLICABILITY: MODES 1 and 2 with the mechanical vacuum pump in service and any main steam line not isolated.

ACTIONS

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

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more channels inoperable.	A.1	Restore channel to OPERABLE status.	12 hours
	<u>OR</u>		
	A.2	---------NOTE-------- Not applicable if inoperable channel is the result of an inoperable mechanical vacuum pump breaker. -------------------- Place channel in trip.	12 hours
B. Mechanical vacuum pump trip capability not maintained.	B.1	Restore trip capability.	1 hour

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Required Action and associated Completion Time not met.	C.1	Isolate the associated mechanical vacuum pump.	12 hours
	<u>OR</u>		
	C.2	Remove the associated mechanical vacuum pump breaker(s) from service.	12 hours
	<u>OR</u>		
	C.3	Isolate the main steam lines.	12 hours
	<u>OR</u>		
	C.4	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 mechanical vacuum pump trip capability is maintained.

SURVEILLANCE		FREQUENCY
SR 3.3.7.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.7.2.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.7.2.3	------------------NOTE------------------ Radiation detectors are excluded. -- Perform CHANNEL CALIBRATION.	92 days
SR 3.3.7.2.4	Perform CHANNEL CALIBRATION. The Allowable Value shall be ≤ 15 x full power background within hydrogen injection.	24 months
SR 3.3.7.2.5	Perform LOGIC SYSTEM FUNCTIONAL TEST including mechanical vacuum pump breaker actuation.	24 months

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 diesel generator 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 diesel generator (DG) inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

-----NOTES-----

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 LOP initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.8.1.1	Perform CHANNEL FUNCTIONAL TEST.	24 months
SR 3.3.8.1.2	Perform CHANNEL CALIBRATION.	24 months
SR 3.3.8.1.3	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months

Table 3.3.8.1-1 (page 1 of 1)
Loss of Power Instrumentation

FUNCTION	REQUIRED CHANNELS PER BUS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. 4160 V Essential Service System Bus Undervoltage (Loss of Voltage)	2	SR 3.3.8.1.1 SR 3.3.8.1.2 SR 3.3.8.1.3	[≥ 2893 V and ≤ 3197 V]
2. 4160 V Essential Service System Bus Undervoltage (Degraded Voltage)			
a. Bus Undervoltage/Time Delay	2	SR 3.3.8.1.1 SR 3.3.8.1.2 SR 3.3.8.1.3	[≥ 3845 V with time delay ≥ 5.6 seconds and ≤ 8.4 seconds]
b. Time Delay (No LOCA)	1	SR 3.3.8.1.1 SR 3.3.8.1.2 SR 3.3.8.1.3	[≥ 285 seconds and ≤ 315 seconds]

3.3 INSTRUMENTATION

3.3.8.2 Reactor Protection System (RPS) Electric Power Monitoring

LCO 3.3.8.2 Two RPS electric power monitoring assemblies shall be OPERABLE for each inservice RPS motor generator set or alternate power supply.

APPLICABILITY: MODES 1 and 2,
MODE 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or both inservice power supplies with one electric power monitoring assembly inoperable.	A.1	Remove associated inservice power supply(s) from service.	72 hours
B. One or both inservice power supplies with both electric power monitoring assemblies inoperable.	B.1	Remove associated inservice power supply(s) from service.	1 hour
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1 or 2.	C.1	Be in MODE 3.	12 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A or B not met in MODE 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies.	D.1 Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.8.2.1	------------------NOTE------------------ Only required to be performed prior to entering MODE 2 from MODE 3 or 4, when in MODE 4 for ≥ 24 hours. -- Perform CHANNEL FUNCTIONAL TEST.	184 days
SR 3.3.8.2.2	Perform CHANNEL CALIBRATION. The Allowable Values shall be: a. Overvoltage ≤ [129.6] V, with time delay set to ≤ [4] seconds. b. Undervoltage ≥ [105.3] V, with time delay set to ≤ [4] seconds. c. Underfrequency ≥ [55.4] Hz, with time delay set to ≤ [4] seconds.	24 months
SR 3.3.8.2.3	Perform a system functional test.	24 months

B 3.3 INSTRUMENTATION

B 3.3.1.1 Reactor Protection System (RPS) Instrumentation

BASES

BACKGROUND

The RPS initiates a reactor scram when one or more monitored parameters exceed their specified limits to preserve the integrity of the fuel cladding and the reactor coolant pressure boundary (RCPB) and minimize the energy that must be absorbed following a loss of coolant accident (LOCA). This can be accomplished either automatically or manually.

The protection and monitoring functions of the RPS have been designed to ensure safe operation of the reactor. This is achieved by specifying limiting safety system settings (LSSS) in terms of parameters directly monitored by the RPS, as well as LCOs on other reactor system parameters and equipment performance. The LSSS are defined in this Specification as the Allowable Values, which, in conjunction with the LCOs, establish the threshold for protective system action to prevent exceeding acceptable limits, including Safety Limits (SLs) during Design Basis Accidents (DBAs).

The RPS, as described in the UFSAR, Section 7.2 (Ref. 1), includes sensors, relays, bypass circuits, and switches that are necessary to cause initiation of a reactor scram. Functional diversity is provided by monitoring a wide range of dependent and independent parameters. The input parameters to the scram logic are from instrumentation that monitors reactor vessel water level, reactor vessel pressure, neutron flux, main steam line isolation valve position, turbine control valve (TCV) fast closure, turbine stop valve (TSV) position, drywell pressure, scram discharge volume (SDV) water level, and turbine condenser vacuum, as well as reactor mode switch in shutdown position and manual scram signals. There are at least four redundant sensor input signals from each of these parameters (with the exception of the reactor mode switch in shutdown and manual scram signals). 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 an RPS trip signal to the trip logic.

(continued)

BASES

BACKGROUND (continued)

The RPS is comprised of two independent trip systems (A and B) with three logic channels in each trip system (automatic logic channels A1 and A2 and manual logic channel A3, automatic logic channels B1 and B2 and manual logic channel B3) as described in Reference 1. The outputs of the automatic logic channels in a trip system are combined in a one-out-of-two logic so that either channel can trip the associated trip system. The tripping of both trip systems will produce a reactor scram. This logic arrangement is referred to as a one-out-of-two taken twice logic. There are four RPS channel test switches, one associated with each of the four automatic trip channels. These test switches allow the operator to test the OPERABILITY of the individual trip channel automatic scram contactors. In addition, trip channels A3 and B3 (one trip channel per trip system) are provided for manual scram. Placing the reactor mode switch in shutdown position or depressing both manual scram push buttons (one per trip system) will initiate the manual trip function. Each trip system can be reset by use of a reset switch. If a full scram occurs (both trip systems trip) and after the reactor mode switch is placed in the shutdown position, a relay prevents reset of the trip systems for 10 seconds. This 10 second delay on reset ensures that the scram function will be completed.

Two scram pilot valves are located in the hydraulic control unit for each control rod drive (CRD). Each scram pilot valve is solenoid operated, with the solenoids normally energized. The scram pilot valves control the air supply to the scram inlet and outlet valves for the associated CRD. When either scram pilot valve solenoid is energized, air pressure holds the scram valves closed and, therefore, both scram pilot valve solenoids must be de-energized to cause a control rod to scram. The scram valves control the supply and discharge paths for the CRD water during a scram. One of the scram pilot valve solenoids for each CRD is controlled by trip system A, and the other solenoid is controlled by trip system B. Any trip of trip system A in conjunction with any trip in trip system B results in de-energizing both solenoids, air bleeding off, scram valves opening, and control rod scram.

(continued)

BACKGROUND (continued)

The backup scram valves, which energize on a scram signal to depressurize the scram air header, are also controlled by the RPS. Additionally, the RPS System controls the SDV vent and drain valves such that when both trip systems trip, the SDV vent and drain valves close to isolate the SDV.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The actions of the RPS are assumed in the safety analyses of References 2, 3, and 4. The RPS initiates a reactor scram when monitored parameter values exceed the Allowable Values, specified by the setpoint methodology and listed in Table 3.3.1.1-1 to preserve the integrity of the fuel cladding, the RCPB, and the containment by minimizing the energy that must be absorbed following a LOCA.

RPS instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). Functions not specifically credited in the accident analysis are retained for the overall redundancy and diversity of the RPS as required by the NRC approved licensing basis.

The OPERABILITY of the RPS is dependent on the OPERABILITY of the individual instrumentation channel Functions specified in Table 3.3.1.1-1. Each Function must have a required number of OPERABLE channels per RPS trip system, with their setpoints within the specified Allowable Value, where appropriate. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. Each channel must also respond within its assumed response time, where applicable.

Allowable Values are specified for each RPS Function specified in the Table. Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the actual 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.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

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.

For nuclear instrumentation Functions (i.e., Functions 1.a, 2.a, 2.b, and 2.c), the Allowable Values are derived from the analytic limits, corrected for calibration, process, and some of the instrument errors. The trip setpoints for these Functions 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 and appropriately applied for the instrumentation.

For all Functions other than these associated with nuclear instrumentation (i.e., other than Functions 1.a, 2.a, 2.b, and 2.c), the trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

The OPERABILITY of scram pilot valves and associated solenoids, backup scram valves, and SDV valves, described in the Background section, are not addressed by this LCO.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The individual Functions are required to be OPERABLE in the MODES or other conditions specified in the table, which may require an RPS trip to mitigate the consequences of a design basis accident or transient. To ensure a reliable scram function, a combination of Functions are required in each MODE to provide primary and diverse initiation signals.

The only MODES specified in Table 3.3.1.1-1 are MODES 1 and 2, and MODE 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies. No RPS Function is required in MODES 3 and 4, since all control rods are fully inserted and the Reactor Mode Switch Shutdown Position control rod withdrawal block (LCO 3.3.2.1) does not allow any control rod to be withdrawn. In MODE 5, control rods withdrawn from a core cell containing no fuel assemblies do not affect the reactivity of the core and, therefore, are not required to have the capability to scram. Provided all other control rods remain inserted, no RPS Function is required. In this condition, the required SDM (LCO 3.1.1) and refuel position one-rod-out interlock (LCO 3.9.2) ensure that no event requiring RPS will occur. Under these conditions, the RPS function is not required to be OPERABLE.

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

Intermediate Range Monitor (IRM)

1.a. Intermediate Range Monitor Neutron Flux - High

The IRMs monitor neutron flux levels from the upper range of the source range monitor (SRM) to the lower range of the average power range monitors (APRMs). The IRMs are capable of generating trip signals that can be used to prevent fuel damage resulting from abnormal operating transients in the intermediate power range. In this power range, the most significant source of reactivity change is due to control rod withdrawal. The IRM provides a diverse protection function from the rod worth minimizer (RWM), which monitors and controls the movement of control rods at low power. The

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.a. Intermediate Range Monitor Neutron Flux - High (continued)

RWM prevents the withdrawal of an out of sequence control rod during startup that could result in an unacceptable neutron flux excursion (Ref. 5). The IRM provides mitigation of the neutron flux excursion. To demonstrate the capability of the IRM System to mitigate control rod withdrawal events, generic analysis has been performed (Ref. 6) to evaluate the consequences of control rod withdrawal events during startup that are mitigated only by the IRM. This analysis, which assumes that one IRM channel in each trip system is bypassed, demonstrates that the IRMs provide protection against local control rod withdrawal errors and results in peak fuel enthalpy below the 170 cal/gm fuel failure threshold criterion.

The IRMs are also capable of limiting other reactivity excursions during startup, such as cold water injection events, although no credit is specifically assumed.

The IRM System is divided into two groups of IRM channels, with four IRM channels inputting to each trip system. The analysis of Reference 6 assumes that one channel in each trip system is bypassed. Therefore, six channels with three channels in each trip system are required for IRM OPERABILITY to ensure that no single instrument failure will preclude a scram from this Function on a valid signal. This trip is active in each of the 10 ranges of the IRM, which must be selected by the operator to maintain the neutron flux within the monitored level of an IRM range.

The analysis of Reference 6 has adequate conservatism to permit the IRM Allowable Value specified in Table 3.3.1.1-1.

The Intermediate Range Monitor Neutron Flux - High Function must be OPERABLE during MODE 2 when control rods may be withdrawn and the potential for criticality exists. In MODE 5, when a cell with fuel has its control rod withdrawn, the IRMs provide monitoring for and protection against unexpected reactivity excursions. In MODE 1, the APRM

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APPLICABLE SAFETY ANALYSES LCO and APPLICABILITY

1.a. Intermediate Range Monitor Neutron Flux - High (continued)

System, the RWM, and Rod Block Monitor provide protection against control rod withdrawal error events and the IRMs are not required. The IRMs are automatically bypassed when the Reactor Mode Switch is in the run position.

1.b. Intermediate Range Monitor - Inop

This trip signal provides assurance that a minimum number of IRMs are OPERABLE. Anytime an IRM mode switch is moved to any position other than "Operate," the detector voltage drops below a preset level, or when a module is not plugged in, an inoperative trip signal will be received by the RPS unless the IRM is bypassed. Since only one IRM in each trip system may be bypassed, only one IRM in each RPS trip system may be inoperable without resulting in an RPS trip signal.

This Function was not specifically credited in the accident analysis but it is retained for the overall redundancy and diversity of the RPS as required by the NRC approved licensing basis.

Six channels of Intermediate Range Monitor - Inop with three channels in each trip system are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function on a valid signal.

There is no Allowable Value for this Function.

This Function is required to be OPERABLE when the Intermediate Range Monitor Neutron Flux - High Function is required.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Average Power Range Monitor

2.a. Average Power Range Monitor Neutron Flux—High, Setdown

The APRM channels receive input signals from the local power range monitors (LPRMs) within the reactor core, which provide an indication of the power distribution and local power changes. The APRM channels average these LPRM signals to provide a continuous indication of average reactor power from a few percent to greater than RTP. For operation at low power (i.e., MODE 2), the Average Power Range Monitor Neutron Flux—High, Setdown Function is capable of generating a trip signal that prevents fuel damage resulting from abnormal operating transients in this power range. For most operation at low power levels, the Average Power Range Monitor Neutron Flux—High, Setdown Function will provide a secondary scram to the Intermediate Range Monitor Neutron Flux—High Function because of the relative setpoints. With the IRMs at Range 9 or 10, it is possible that the Average Power Range Monitor Neutron Flux—High, Setdown Function will provide the primary trip signal for a core-wide increase in power.

No specific safety analyses take direct credit for the Average Power Range Monitor Neutron Flux—High, Setdown Function. However, this Function indirectly ensures that before the reactor mode switch is placed in the run position, reactor power does not exceed 25% RTP (SL 2.1.1.1) when operating at low reactor pressure and low core flow. Therefore, it indirectly prevents fuel damage during significant reactivity increases with THERMAL POWER < 25% RTP.

The APRM System is divided into two groups of channels with three APRM channel inputs to each trip system. The system is designed to allow one channel in each trip system to be bypassed. Any one APRM channel in a trip system can cause the associated trip system to trip. Four channels of Average Power Range Monitor Neutron Flux—High, Setdown with two channels in each trip system are required to be OPERABLE to ensure that no single failure will preclude a scram from

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.a. Average Power Range Monitor Neutron Flux – High, Setdown (continued)

this Function on a valid signal. In addition, to provide adequate coverage of the entire core, at least 50% of the LPRM inputs are required for each APRM channel, with at least two LPRM inputs from each of the four axial levels at which the LPRMs are located.

The Allowable Value is based on preventing significant increases in power when THERMAL POWER is < 25% RTP.

The Average Power Range Monitor Neutron Flux – High, Setdown Function must be OPERABLE during MODE 2 when control rods may be withdrawn and the potential for fuel damage from abnormal operating transients exists. In MODE 1, the Average Power Range Monitor Neutron Flux – High Function provides protection against reactivity transients and the RWM and rod block monitor protect against control rod withdrawal error events.

2.b. Average Power Range Monitor Flow Biased Neutron Flux – High

The Average Power Range Monitor Flow Biased Neutron Flux – High Function monitors neutron flux. The APRM neutron flux trip level is varied as a function of recirculation drive flow (i.e., at lower core flows, the setpoint is reduced proportional to the reduction in power experienced as core flow is reduced but is clamped at an upper limit that is equivalent to the Average Power Range Monitor Fixed Neutron Flux – High Function Allowable Value. The Average Power Range Monitor Flow Biased Neutron Flux – High Function provides protection against transients where THERMAL POWER increases slowly (such as the recirculation loop flow controller failure event with increasing flow and the loss of feedwater heating event) and protects the fuel cladding integrity by ensuring that the MCPR SL is not exceeded. During any transient event that occurs at a reduced

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.b. Average Power Range Monitor Flow Biased Neutron Flux—High (continued)

recirculation flow, because of a lower scram trip setpoint, the Average Power Range Monitor Flow Biased Neutron Flux—High Function will initiate a scram before the clamped Allowable Value is reached.

The APRM System is divided into two groups of channels with three APRM channels providing inputs to each trip system. The system is designed to allow one channel in each trip system to be bypassed. Any one APRM channel in a trip system can cause the associated trip system to trip. Four channels of Average Power Range Monitor Flow Biased Neutron Flux—High with two channels in each trip system arranged in a one-out-of-two logic are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function on a valid signal. In addition, to provide adequate coverage of the entire core, at least 50% of the LPRM inputs are required for each APRM channel, with at least two LPRM inputs from each of the four axial levels at which the LPRMs are located. Each APRM channel receives one total drive flow signal representative of total core flow. The total drive flow signals are generated by two flow converters, one of which supplies signals to the trip system A APRMs, while the other supplies signals to the trip system B APRMs. Each flow converter signal is provided by summing up a flow signal from the two recirculation loops. Each required Average Power Range Monitor Flow Biased Neutron Flux—High channel requires an input from one OPERABLE flow converter (e.g., if a converter unit is inoperable, the associated Average Power Range Monitor Flow Biased Neutron Flux—High channels must be considered inoperable). An APRM flow converter is considered inoperable whenever it cannot deliver a flow signal less than or equal to actual recirculation flow conditions for all steady state and transient reactor conditions while in MODE 1. Reduced flow or downscale flow converter conditions due to planned maintenance or testing activities during derated plant conditions (i.e., end of cycle coast down) will result in conservative setpoints for the APRM flow bias functions, thus maintaining the function OPERABLE.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.b. Average Power Range Monitor Flow Biased Neutron Flux – High (continued)

The Allowable Value is selected to ensure the fuel cladding integrity by ensuring that the MCPR SL is not exceeded. "W," in the Allowable Value column of Table 3.3.1.1-1, is the percentage of recirculation loop flow which provides a rated core flow of 98 million lbs/hr.

The Average Power Range Monitor Flow Biased Neutron Flux – High Function is required to be OPERABLE in MODE 1 when there is the possibility of generating excessive THERMAL POWER and potentially exceeding the SL applicable to high pressure and core flow conditions (MCPR SL). During MODES 2 and 5, other IRM and APRM Functions provide protection for fuel cladding integrity.

2.c. Average Power Range Monitor Fixed Neutron Flux – High

The APRM channels provide the primary indication of neutron flux within the core and respond almost instantaneously to neutron flux increases. The Average Power Range Monitor Fixed Neutron Flux – High Function is capable of generating a trip signal to prevent fuel damage or excessive Reactor Coolant System (RCS) pressure. For the overpressurization protection analysis of Reference 2, the Average Power Range Monitor Fixed Neutron Flux – High Function is assumed to terminate the main steam isolation valve (MSIV) closure event and, along with the safety valves, limits the peak reactor pressure vessel (RPV) pressure to less than the ASME Code limits. The control rod drop accident (CRDA) analysis (Ref. 7) takes credit for the Average Power Range Monitor Fixed Neutron Flux – High Function to terminate the CRDA.

The APRM System is divided into two groups of channels with three APRM channels inputting to each trip system. The system is designed to allow one channel in each trip system to be bypassed. Any one APRM channel in a trip system can cause the associated trip system to trip. Four channels of

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.c. Average Power Range Monitor Fixed Neutron Flux — High (continued)

Average Power Range Monitor Fixed Neutron Flux — High with two channels in each trip system arranged in a one-out-of-two logic are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function on a valid signal. In addition, to provide adequate coverage of the entire core, at least 50% of the LPRM inputs are required for each APRM channel, with at least two LPRM inputs from each of the four axial levels at which the LPRMs are located.

The Allowable Value is based on the Analytical Limit assumed in the CRDA analyses.

The Average Power Range Monitor Fixed Neutron Flux — High Function is required to be OPERABLE in MODE 1 where the potential consequences of the analyzed transients could result in the SLs (e.g., MCPR and RCS pressure) being exceeded. Although the Average Power Range Monitor Fixed Neutron Flux — High Function is assumed in the CRDA analysis (Ref. 7), which is applicable in MODE 2, the Average Power Range Monitor Neutron Flux — High, Setdown Function conservatively bounds the assumed trip and, together with the assumed IRM trips, provides adequate protection. Therefore, the Average Power Range Monitor Fixed Neutron Flux — High Function is not required in MODE 2.

2.d. Average Power Range Monitor — Inop

This signal provides assurance that a minimum number of APRMs are OPERABLE. For any APRM, anytime its APRM mode switch is moved to any position other than "Operate," an APRM module is unplugged, or the APRM has too few LPRM inputs (< 50%), an inoperative trip signal will be received by the RPS, unless the APRM is bypassed. Since only one APRM in each trip system may be bypassed, only one APRM in each trip system may be inoperable without resulting in an RPS trip signal. This Function was not specifically credited in the accident analysis, but it is retained for the overall redundancy and diversity of the RPS as required by the NRC approved licensing basis.

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.d. Average Power Range Monitor - Inop (continued)

Four channels of Average Power Range Monitor - Inop with two channels in each trip system are required to be OPERABLE to ensure that no single failure will preclude a scram from this Function on a valid signal.

There is no Allowable Value for this Function.

This Function is required to be OPERABLE in the MODES where the other APRM Functions are required.

3. Reactor Vessel Steam Dome Pressure - High

An increase in the RPV pressure during reactor operation compresses the steam voids and results in a positive reactivity insertion. This causes the neutron flux and THERMAL POWER transferred to the reactor coolant to increase, which could challenge the integrity of the fuel cladding and the RCPB. No specific safety analysis takes direct credit for this Function. However, the Reactor Vessel Steam Dome Pressure - High Function initiates a scram for transients that results in a pressure increase, counteracting the pressure increase by rapidly reducing core power. For the overpressurization protection analysis of Reference 2, reactor scram (the analyses conservatively assume scram on the Average Power Range Monitor Fixed Neutron Flux - High signal, not the Reactor Vessel Steam Dome Pressure - High or the Main Steam Isolation Valve - Closure signals), along with the safety valves, limits the peak RPV pressure to less than the ASME Section III Code limits.

High reactor pressure signals are initiated from four pressure transmitters that sense reactor pressure. The Reactor Vessel Steam Dome Pressure - High Allowable Value is chosen to provide a sufficient margin to the ASME Section III Code limits during the event.

Four channels of Reactor Vessel Steam Dome Pressure - High Function, with two channels in each trip system arranged in a one-out-of-two logic, are required to be OPERABLE to ensure that no single instrument failure will preclude a

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3. Reactor Vessel Steam Dome Pressure - High (continued)

scram from this Function on a valid signal. The Function is required to be OPERABLE in MODES 1 and 2 when the RCS is pressurized and the potential for pressure increase exists.

4. Reactor Vessel Water Level - Low

Low RPV water level indicates the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, a reactor scram is initiated at this level to substantially reduce the heat generated in the fuel from fission. The Reactor Vessel Water Level - Low Function is assumed in the analysis of the recirculation line break (Ref. 8) and is credited in the loss of normal feedwater flow event (Ref. 9). The reactor scram reduces the amount of energy required to be absorbed and, along with the actions of the Emergency Core Cooling Systems (ECCS), ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Reactor Vessel Water Level - Low signals are initiated from four differential pressure 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 Function, with two channels in each trip system arranged in a one-out-of-two logic, are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function on a valid signal.

The Reactor Vessel Water Level - Low Allowable Value is selected to ensure that during normal operation the separator skirts are not uncovered (this protects available recirculation pump net positive suction head (NPSH) from significant carryunder) and, for transients involving loss of all normal feedwater flow, initiation of the low pressure ECCS subsystems at Reactor Vessel Water - Low Low will not be required.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

4. Reactor Vessel Water Level – Low (continued)

The Function is required in MODES 1 and 2 where considerable energy exists in the RCS resulting in the limiting transients and accidents. ECCS initiations at Reactor Vessel Water Level – Low Low provide sufficient protection for level transients in all other MODES.

5. Main Steam Isolation Valve – Closure

MSIV closure results in loss of the main turbine and the condenser as a heat sink for the nuclear steam supply system and indicates a need to shut down the reactor to reduce heat generation. Therefore, a reactor scram is initiated on a Main Steam Isolation Valve – Closure signal before the MSIVs are completely closed in anticipation of the complete loss of the normal heat sink and subsequent overpressurization transient. However, for the overpressurization protection analysis of Reference 2, the Average Power Range Monitor Fixed Neutron Flux – High Function, along with the safety valves, limits the peak RPV pressure to less than the ASME Code limits. That is, the direct scram on position switches for MSIV closure events is not assumed in the overpressurization analysis. Additionally, MSIV closure is assumed in the transients analyzed in Reference 4 (e.g., low steam line pressure, manual closure of MSIVs, high steam line flow).

The reactor scram reduces the amount of energy required to be absorbed and, along with the actions of the ECCS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

MSIV closure signals are initiated from position switches located on each of the eight MSIVs. Each MSIV has a position switch which operates two contacts; one contact inputs to RPS trip system A while the other inputs to RPS trip system B. Thus, each RPS trip system receives an input from eight Main Steam Isolation Valve – Closure channels, each consisting of a position switch and contact. The logic for the Main Steam Isolation Valve – Closure Function is

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

5. Main Steam Isolation Valve - Closure (continued)

arranged such that either the inboard or outboard valve on three or more of the main steam lines must close in order for a scram to occur. In addition, certain combinations of valves closed in two lines will result in a half-scram.

The Main Steam Isolation Valve - Closure Allowable Value is specified to ensure that a scram occurs prior to a significant reduction in steam flow, thereby reducing the severity of the subsequent pressure transient.

Sixteen channels of the Main Steam Isolation Valve - Closure Function, with eight channels in each trip system, are required to be OPERABLE to ensure that no single instrument failure will preclude the scram from this Function on a valid signal. This Function is only required in MODE 1 since, with the MSIVs open and the heat generation rate high, a pressurization transient can occur if the MSIVs close. In MODE 2, the heat generation rate is low enough so that the other diverse RPS functions provide sufficient protection.

6. Drywell Pressure - High

High pressure in the drywell could indicate a break in the RCPB. A reactor scram is initiated to minimize the possibility of fuel damage and to reduce the amount of energy being added to the coolant and the drywell. The Drywell Pressure - High Function is assumed to scram the reactor for LOCAs inside the primary containment.

The reactor scram reduces the amount of energy required to be absorbed and, along with the actions of the ECCS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

6. Drywell Pressure – High (continued)

High drywell pressure signals are initiated from four pressure switches that sense drywell pressure. The Allowable Value was selected to be as low as possible and indicative of a LOCA inside primary containment.

Four channels of Drywell Pressure – High Function, with two channels in each trip system arranged in a one-out-of-two logic, are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function on a valid signal. The Function is required in MODES 1 and 2 where considerable energy exists in the RCS, resulting in the limiting transients and accidents.

7a, 7b. Scram Discharge Volume Water Level – High

The SDV receives the water displaced by the motion of the CRD pistons during a reactor scram. Should this volume fill to a point where there is insufficient volume to accept the displaced water, control rod insertion would be hindered. Therefore, a reactor scram is initiated while the remaining free volume is still sufficient to accommodate the water from a full core scram. The two types of Scram Discharge Volume Water Level – High Functions are an input to the RPS logic. No credit is taken for a scram initiated from these Functions for any of the design basis accidents or transients analyzed in the UFSAR. However, they are retained to ensure the RPS remains OPERABLE.

SDV water level is measured by two diverse methods. The level in each of the two SDVs is measured by two differential pressure transmitters (and associated switch) and two thermal probes for a total of eight level signals. The outputs of these devices are arranged so that there is a signal from a differential pressure switch and a thermal probe to each RPS logic channel. The level measurement instrumentation satisfies the recommendations of Reference 10.

The Allowable Value is chosen low enough to ensure that there is sufficient volume in the SDV to accommodate the water from a full scram.

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

7a, 7b. Scram Discharge Volume Water Level - High (continued)

Four channels of each type of Scram Discharge Volume Water Level - High Function, with two channels of each type in each trip system, are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from these Functions on a valid signal. These Functions are required in MODES 1 and 2, and in MODE 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies, since these are the MODES and other specified conditions when control rods are withdrawn. At all other times, this Function may be bypassed.

8. Turbine Stop Valve - Closure

Closure of the TSVs results in the loss of a heat sink that produces reactor pressure, neutron flux, and heat flux transients that must be limited. Therefore, a reactor scram is initiated at the start of TSV closure in anticipation of the transients that would result from the closure of these valves. The Turbine Stop Valve - Closure Function is the primary scram signal for the turbine trip event analyzed in Reference 11. For this event, the reactor scram reduces the amount of energy required to be absorbed and ensures that the MCPR SL is not exceeded.

Turbine Stop Valve - Closure signals are initiated from position switches located on each of the four TSVs. A position switch and two independent contacts are associated with each stop valve. One of the two contacts provides input to RPS trip system A; the other, to RPS trip system B. Thus, each RPS trip system receives an input from four Turbine Stop Valve - Closure channels, each consisting of one position switch (which is common to a channel in the other RPS trip system) and a switch contact. The logic for the Turbine Stop Valve - Closure Function is such that three or more TSVs must be closed to produce a scram. This Function must be enabled at THERMAL POWER ≥ 45% RTP. This is

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

8. Turbine Stop Valve – Closure (continued)

normally accomplished automatically by pressure switches sensing turbine first stage pressure; therefore, opening the turbine bypass valves may affect this Function.

The Turbine Stop Valve – Closure Allowable Value is selected to be high enough to detect imminent TSV closure, thereby reducing the severity of the subsequent pressure transient.

Eight channels of Turbine Stop Valve – Closure Function, with four channels in each trip system, are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function if any three TSVs should close. This Function is required, consistent with analysis assumptions, whenever THERMAL POWER is ≥ 45% RTP. This Function is not required when THERMAL POWER is < 45% RTP since the Reactor Vessel Steam Dome Pressure – High and the Average Power Range Monitor Fixed Neutron Flux – High Functions are adequate to maintain the necessary safety margins.

9. Turbine Control Valve Fast Closure, Trip Oil Pressure – Low

Fast closure of the TCVs results in the loss of a heat sink that produces reactor pressure, neutron flux, and heat flux transients that must be limited. Therefore, a reactor scram is initiated on TCV fast closure in anticipation of the transients that would result from the closure of these valves. The Turbine Control Valve Fast Closure, Trip Oil Pressure – Low Function is the primary scram signal for the generator load rejection event analyzed in Reference 12. For this event, the reactor scram reduces the amount of energy required to be absorbed and ensures that the MCPR SL is not exceeded.

Turbine Control Valve Fast Closure, Trip Oil Pressure – Low signals are initiated by the electrohydraulic control (EHC) fluid pressure at each control valve. One pressure switch is associated with each control valve, and the signal from each switch is assigned to a separate RPS logic channel. This Function must be enabled at THERMAL POWER ≥ 45% RTP.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

9. Turbine Control Valve Fast Closure, Trip Oil Pressure − Low (continued)

This is normally accomplished automatically by pressure switches sensing turbine first stage pressure; therefore, opening the turbine bypass valves may affect this Function.

The Turbine Control Valve Fast Closure, Trip Oil Pressure − Low Allowable Value is selected high enough to detect imminent TCV fast closure.

Four channels of Turbine Control Valve Fast Closure, Trip Oil Pressure − Low Function with two channels in each trip system arranged in a one-out-of-two logic are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function on a valid signal. This Function is required, consistent with the analysis assumptions, whenever THERMAL POWER is ≥ 45% RTP. This Function is not required when THERMAL POWER is < 45% RTP, since the Reactor Vessel Steam Dome Pressure − High and the Average Power Range Monitor Fixed Neutron Flux − High Functions are adequate to maintain the necessary safety margins.

10. Turbine Condenser Vacuum−Low

The Turbine Condenser Vacuum − Low Function is provided to shut down the reactor and reduce the energy input to the main condenser to help prevent overpressurization of the main condenser in the event of a loss of the main condenser vacuum. The Turbine Condenser Vacuum − Low Function is the primary scram signal for the loss of condenser vacuum event analyzed in Reference 9. For this event, the reactor scram reduces the amount of energy required to be absorbed by the main condenser and helps to ensure the MCPR SL is not exceeded by reducing the core energy prior to the fast closure of the turbine stop valves. This Function helps maintain the main condenser as a heat sink during this event.

Turbine condenser vacuum pressure signals are derived from four pressure switches that sense the pressure in the condenser. The Allowable Value was selected to reduce the

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

10. Turbine Condenser Vacuum—Low (continued)

severity of a loss of main condenser vacuum event by anticipating the transient and scramming the reactor at a higher vacuum than the setpoints that close the turbine stop valves and bypass valves.

Four channels of Turbine Condenser Vacuum — Low Function, with two channels in each trip system arranged in a one-out-of-two logic, are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function on a valid signal. The Function is required in MODE 1 since in this MODE there is a significant amount of core energy that can be rejected to the main condenser. During MODES 2, 3, 4, and 5, the core energy is significantly lower. This Function is automatically bypassed with the reactor mode switch in any position other than run.

11. Reactor Mode Switch — Shutdown Position

The Reactor Mode Switch — Shutdown Position Function provides signals, via the two manual scram logic channels (A3 and B3), which are redundant to the automatic protective instrumentation channels and provide manual reactor trip capability. This Function was not specifically credited in the accident analysis, but it is retained for the overall redundancy and diversity of the RPS as required by the NRC approved licensing basis.

The reactor mode switch is a single switch with two channels, each of which provides input into one of the two manual scram RPS logic channels.

There is no Allowable Value for this Function, since the channels are mechanically actuated based solely on reactor mode switch position.

Two channels of Reactor Mode Switch — Shutdown Position Function, with one channel in each manual trip system, are available and required to be OPERABLE. The Reactor Mode Switch — Shutdown Position Function is required to be

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

11. Reactor Mode Switch—Shutdown Position (continued)

OPERABLE in MODES 1 and 2, and MODE 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies, since these are the MODES and other specified conditions when control rods are withdrawn.

12. Manual Scram

The Manual Scram push button channels provide signals, via the two manual scram logic channels (A3 and B3), which are redundant to the automatic protective instrumentation channels and provide manual reactor trip capability. This Function was not specifically credited in the accident analysis but it is retained for the overall redundancy and diversity of the RPS as required by the NRC approved licensing basis.

There is one Manual Scram push button channel for each of the two manual scram RPS logic channels. In order to cause a scram it is necessary that both channels be actuated.

There is no Allowable Value for this Function since the channels are mechanically actuated based solely on the position of the push buttons.

Two channels of Manual Scram with one channel in each manual trip system are available and required to be OPERABLE in MODES 1 and 2, and in MODE 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies, since these are the MODES and other specified conditions when control rods are withdrawn.

ACTIONS

Note 1 has been provided to modify the ACTIONS related to RPS 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

(continued)

ACTIONS (continued)

entry into the Condition. However, the Required Actions for inoperable RPS 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 RPS instrumentation channel.

Note 2 has been provided to modify the ACTIONS for the RPS instrumentation functions of APRM Flow Biased Neutron Flux-High (Function 2.b) and APRM Fixed Neutron Flux - High (Function 2.c) when they are inoperable due to failure of SR 3.3.1.1.2 and gain adjustments are necessary. Note 2 allows entry into associated Conditions and Required Actions to be delayed for up to 2 hours if the gain adjustment factor (GAF) is high (non-conservative), and for up to 12 hours if the GAF is low (conservative). The GAF for any channel is defined as the power value determined by the heat balance divided by the APRM reading for that channel. Upon completion of the gain adjustment, or expiration of the allowed time, the channel must be returned to OPERABLE status or the applicable Condition entered and the Required Actions taken. This Note is based on the time required to perform gain adjustments on multiple channels and additional time is allowed when the GAF is out of limits but conservative.

A.1 and A.2

Because of the diversity of sensors available to provide trip signals and the redundancy of the RPS design, an allowable out of service time of 12 hours has been shown to be acceptable (Ref. 13) to permit restoration of any inoperable required channel to OPERABLE status. However, this out of service time is only acceptable provided the associated Function's inoperable channel is in one trip system and the Function still maintains RPS trip capability (refer to Required Actions B.1, B.2, and C.1 Bases). If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel or the associated trip system must be placed in the tripped condition per Required Actions A.1 and A.2. Placing the inoperable channel in trip (or the associated trip system in trip) would conservatively compensate for the inoperability,

(continued)

ACTIONS

A.1 and A.2 (continued)

restore capability to accommodate a single failure, and allow operation to continue. Alternatively, if it is not desired to place the channel (or trip system) in trip (e.g., as in the case where placing the inoperable channel in trip would result in a scram), Condition D must be entered and its Required Action taken. The 12 hour allowance is not allowed for Reactor Mode Switch - Shutdown Position and Manual Scram Function channels since with one channel inoperable RPS trip capability is not maintained. In this case, Condition C must be entered and its Required Actions taken.

B.1 and B.2

Condition B exists when, for any one or more Functions, at least one required channel is inoperable in each trip system. In this condition, provided at least one channel per trip system is OPERABLE, the RPS still maintains trip capability for that Function, but cannot accommodate a single failure in either trip system.

Required Actions B.1 and B.2 limit the time the RPS scram logic, for any Function, would not accommodate single failure in both trip systems (e.g., one-out-of-one and one-out-of-one arrangement for a typical four channel Function). The reduced reliability of this logic arrangement was not evaluated in Reference 13 for the 12 hour Completion Time. Within the 6 hour allowance, the associated Function will have all required channels OPERABLE or in trip (or any combination) in one trip system.

Completing one of these Required Actions restores RPS to a reliability level equivalent to that evaluated in Reference 13, which justified a 12 hour allowable out of service time as presented in Condition A. The trip system in the more degraded state should be placed in trip or, alternatively, all the inoperable channels in that trip system should be placed in trip (e.g., a trip system with two inoperable channels could be in a more degraded state than a trip system with four inoperable channels if the two inoperable channels are in the same Function while the four

(continued)

ACTIONS

B.1 and B.2 (continued)

inoperable channels are all in different Functions). The decision of which trip system is in the more degraded state should be based on prudent judgment and take into account current plant conditions (i.e., what MODE the plant is in). If this action would result in a scram, it is permissible to place the other trip system or its inoperable channels in trip.

The 6 hour Completion Time is judged acceptable based on the remaining capability to trip, the diversity of the sensors available to provide the trip signals, the low probability of extensive numbers of inoperabilities affecting all diverse Functions, and the low probability of an event requiring the initiation of a scram.

Alternately, if it is not desired to place the inoperable channels (or one trip system) in trip (e.g., as in the case where placing the inoperable channel or associated trip system in trip would result in a scram), Condition D must be entered and its Required Action taken. The 6 hour allowance is not allowed for Reactor Mode Switch - Shutdown and Manual Scram Function channels since with two channels inoperable RPS trip capability is not maintained. In this case, Condition C must be entered and its Required Action taken.

C.1

Required Action C.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same trip system for the same Function result in the Function not maintaining RPS trip capability. A Function is considered to be maintaining RPS trip capability when sufficient channels are OPERABLE or in trip (or the associated trip system is in trip), such that both trip systems will generate a trip signal from the given Function on a valid signal. For the typical Function with one-out-of-two taken twice logic and the IRM and APRM Functions, this would require both trip systems to have one channel OPERABLE or in trip (or the associated trip system in trip). For Function 5 (Main Steam Isolation Valve - Closure), this would require both trip systems to

(continued)

BASES

ACTIONS

C.1 (continued)

have each channel associated with the MSIVs in three main steam lines (not necessarily the same main steam lines for both trip systems) OPERABLE or in trip (or the associated trip system in trip). For Function 8 (Turbine Stop Valve—Closure), this would require both trip systems to have three channels, each OPERABLE or in trip (or the associated trip system in trip).

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.

D.1

Required Action D.1 directs entry into the appropriate Condition referenced in Table 3.3.1.1-1. The applicable Condition specified in the Table is Function and MODE or other specified condition dependent and may change as the Required Action of a previous Condition is completed. Each time an inoperable channel has not met any Required Action of Condition A, B, or C and the associated Completion Time has expired, Condition D will be entered for that channel and provides for transfer to the appropriate subsequent Condition.

E.1, F.1, and G.1

If the channel(s) is not restored to OPERABLE status or placed in trip (or the associated trip system placed in trip) within the allowed Completion Time, the plant must be placed in a MODE or other specified condition in which the LCO does not apply. The allowed Completion Times are reasonable, based on operating experience, to reach the specified condition from full power conditions in an orderly manner and without challenging plant systems. In addition, the Completion Time of Required Action E.1 is consistent with the Completion Time provided in LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)."

(continued)

BASES

ACTIONS (continued)

H.1

If the channel(s) is not restored to OPERABLE status or placed in trip (or the associated trip system placed in trip) within the allowed Completion Time, the plant must be placed in a MODE or other specified condition in which the LCO does not apply. This is done by immediately initiating action to fully insert all insertable control rods in core cells containing one or more fuel assemblies. Control rods in core cells containing no fuel assemblies do not affect the reactivity of the core and are, therefore, not required to be inserted. Action must continue until all insertable control rods in core cells containing one or more fuel assemblies are fully inserted.

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs for each RPS instrumentation Function are located in the SRs column of Table 3.3.1.1-1.

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 RPS 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. 13) 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 RPS will trip when necessary.

SR 3.3.1.1.1

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1.1 (continued)

approximately the same value. Significant deviations between 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.

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 upon 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 3.3.1.1.2

To ensure that the APRMs are accurately indicating the true core average power, the APRMs are calibrated to the reactor power calculated from a heat balance. LCO 3.2.4, "Average Power Range Monitor (APRM) Gain and Setpoint," allows the APRMs to be reading greater than actual THERMAL POWER to compensate for localized power peaking. When this adjustment is made, the requirement for the APRMs to indicate within 2% RTP of calculated power is modified to require the APRMs to indicate within 2% RTP of the calculated value established by SR 3.2.4.2. The Frequency of once per 7 days is based on minor changes in LPRM sensitivity, which could affect the APRM reading between performances of SR 3.3.1.1.10.

An allowance is provided that requires the SR to be performed only at ≥ 25% RTP because it is difficult to accurately maintain APRM indication of core THERMAL POWER

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1.2 (continued)

consistent with a heat balance when < 25% RTP. At low power levels, a high degree of accuracy is unnecessary because of the large, inherent margin to thermal limits (MCPR, APLHGR, and LHGR). At ≥ 25% RTP, the Surveillance is required to have been satisfactorily performed within the last 7 days, in accordance with SR 3.0.2. A Note is provided which allows an increase in THERMAL POWER above 25% if the 7 day Frequency is not met per SR 3.0.2. In this event, the SR must be performed within 12 hours after reaching or exceeding 25% RTP. Twelve hours is based on operating experience and in consideration of providing a reasonable time in which to complete the SR.

SR 3.3.1.1.3

The Average Power Range Monitor Flow Biased Neutron Flux—High Function uses the recirculation loop drive flows to vary the trip setpoint. This SR ensures that the total loop drive flow signals from the flow converters used to vary the setpoint is appropriately compared to a calibrated flow signal and, therefore, the APRM Function accurately reflects the required setpoint as a function of flow. Each flow signal from the respective flow converter must be ≤ 100% of the calibrated flow signal. If the flow converter signal is not within the limit, all required APRMs that receive an input from the inoperable flow converter must be declared inoperable.

The Frequency of 7 days is based on engineering judgment, operating experience, and the reliability of this instrumentation.

SR 3.3.1.1.4 and SR 3.3.1.1.8

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1.4 and SR 3.3.1.1.8 (continued)

As noted, SR 3.3.1.1.4 is not required to be performed when entering MODE 2 from MODE 1, since testing of the MODE 2 required IRM and APRM Functions cannot be performed in MODE 1 without utilizing jumpers, lifted leads, or movable links. This allows entry into MODE 2 if the 7 day Frequency is not met per SR 3.0.2. In this event, the SR must be performed within 24 hours after entering MODE 2 from MODE 1. Twenty four hours is based on operating experience and in consideration of providing a reasonable time in which to complete the SR.

A Frequency of 7 days for SR 3.3.1.1.4 provides an acceptable level of system average unavailability over the Frequency interval and is based on reliability analysis (Ref. 13). The Frequency of 31 days for SR 3.3.1.1.8 is acceptable based on engineering judgment, operating experience, and the reliability of this instrumentation.

SR 3.3.1.1.5

A functional test of each automatic scram contactor is performed to ensure that each automatic RPS logic channel will perform the intended function. There are four RPS channel test switches, one associated with each of the four automatic trip channels (A1, A2, B1, and B2). These test switches allow the operator to test the OPERABILITY of the individual trip logic channel automatic scram contactors as an alternative to using an automatic scram function trip. This is accomplished by placing the RPS channel test switch in the test position, which will input a trip signal into the associated RPS logic channel. The RPS channel test switches are not specifically credited in the accident analysis. The Manual Scram Functions are not configured the same as the generic model used in Reference 13. However, Reference 13 concluded that the Surveillance Frequency extensions for RPS Functions were not affected by the difference in configuration since each automatic RPS logic channel has a test switch which is functionally the same as

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1.5 (continued)

the manual scram switches in the generic model. As such, a functional test of each RPS automatic scram contactor using either its associated test switch or by test of any of the associated automatic RPS Functions is required to be performed once every 7 days. The Frequency of 7 days is based on the reliability analysis of Reference 13.

SR 3.3.1.1.6 and SR 3.3.1.1.7

These Surveillances are established to ensure that no gaps in neutron flux indication exist from subcritical to power operation for monitoring core reactivity status.

The overlap between SRMs and IRMs is required to be demonstrated to ensure that reactor power will not be increased into a neutron flux region without adequate indication. This is required prior to fully withdrawing SRMs since indication is being transitioned from the SRMs to the IRMs.

The overlap between IRMs and APRMs is of concern when reducing power into the IRM range. On power increases, the system design will prevent further increases (by initiating a rod block) if adequate overlap is not maintained. The IRM/APRM and SRM/IRM overlaps are acceptable if a ½ decade overlap exists.

As noted, SR 3.3.1.1.7 is only required to be met during entry into MODE 2 from MODE 1. That is, after the overlap requirement has been met and indication has transitioned to the IRMs, maintaining overlap is not required (APRMs may be reading downscale once in MODE 2).

If overlap for a group of channels is not demonstrated (e.g., IRM/APRM overlap), the reason for the failure of the Surveillance should be determined and the appropriate channel(s) declared inoperable. Only those appropriate channels that are required in the current MODE or condition should be declared inoperable.

A Frequency of 7 days is reasonable based on engineering judgment and the reliability of the IRMs and APRMs.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.1.9

LPRM gain settings are determined from the local flux profiles measured by the Traversing Incore Probe (TIP) System. This establishes the relative local flux profile for appropriate representative input to the APRM System. The 2000 effective full power hours (EFPH) Frequency is based on operating experience with LPRM sensitivity changes.

SR 3.3.1.1.10 and SR 3.3.1.1.15

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The 92 day Frequency of SR 3.3.1.1.10 is based on the reliability analysis of Reference 13. The 24 month Frequency of SR 3.3.1.1.15 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.

SR 3.3.1.1.11

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 3.3.1.1-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel 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 92 days is based on the reliability analysis of Reference 13.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.1.12, 3.3.1.1.14, and SR 3.3.1.1.16

A 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 adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

Note 1 to SR 3.3.1.1.14 and SR 3.3.1.1.16 states that neutron detectors are excluded from CHANNEL CALIBRATION because they are passive devices, with minimal drift, and because of the difficulty of simulating a meaningful signal. For the APRMs, changes in neutron detector sensitivity are compensated for by performing the 7 day calorimetric calibration (SR 3.3.1.1.2) and the 2000 EFPH LPRM calibration against the TIPs (SR 3.3.1.1.9). A second Note is provided that requires the APRM and IRM SRs to be performed within 24 hours of entering MODE 2 from MODE 1. Testing of the MODE 2 APRM and IRM Functions cannot be performed in MODE 1 without utilizing jumpers, lifted leads, or movable links. This Note allows entry into MODE 2 from MODE 1 if the associated Frequency is not met per SR 3.0.2. Twenty four hours is based on operating experience and in consideration of providing a reasonable time in which to complete the SR. Note 3 to SR 3.3.1.1.14 states that for Function 2.b, this SR is not required for the flow portion of these channels. This allowance is consistent with the plant specific setpoint methodology. This portion of the Function 2.b channels must be calibrated in accordance with SR 3.3.1.1.16.

The Frequency of SR 3.3.1.1.12 is based upon the assumption of a 92 day calibration interval in determination of the magnitude of equipment drift in the setpoint analysis. The Frequency of SR 3.3.1.1.14 is based upon the assumption of a 184 day calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis. The Frequency of SR 3.3.1.1.16 is based upon the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.1.13

This SR ensures that scrams initiated from the Turbine Stop Valve – Closure and Turbine Control Valve Fast Closure, Trip Oil Pressure – Low Functions will not be inadvertently bypassed when THERMAL POWER is ≥ 45% RTP. This involves calibration of the bypass channels. Adequate margins for the instrument setpoint methodologies are incorporated into the actual setpoint. Because main turbine bypass flow can affect this setpoint nonconservatively (THERMAL POWER is derived from turbine first stage pressure), the main turbine bypass valves must remain closed during an in-service calibration at THERMAL POWER ≥ 45% RTP, if performing the calibration using actual turbine first stage pressure, to ensure that the calibration remains valid.

If any bypass channels setpoint is nonconservative (i.e., the Functions are bypassed at ≥ 45% RTP, either due to open main turbine bypass valve(s) or other reasons), then the affected Turbine Stop Valve – Closure and Turbine Control Valve Fast Closure, Trip Oil Pressure – Low Functions are considered inoperable. Alternatively, the bypass channel can be placed in the conservative condition (nonbypass). If placed in the nonbypass condition, this SR is met and the channel is considered OPERABLE.

The Frequency of 92 days is based on engineering judgment and reliability of the components.

SR 3.3.1.1.17

The LOGIC SYSTEM FUNCTIONAL TEST (LSFT) demonstrates the OPERABILITY of the required trip logic for a specific channel. The functional testing of control rods (LCO 3.1.3, "Control Rod Operability"), and SDV vent and drain valves (LCO 3.1.8, "Scram Discharge Volume (SDV) Vent and Drain Valves"), overlaps this Surveillance to provide complete testing of the assumed safety function.

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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1.17 (continued)

Operating experience has shown that these components usually pass the Surveillance when performed at the 24 month Frequency.

SR 3.3.1.1.18

This SR ensures that the individual channel response times are less than or equal to the maximum values assumed in the accident analysis. This test may be performed in one measurement or in overlapping segments, with verification that all components are tested. The RPS RESPONSE TIME acceptance criteria are included in Reference 14.

As noted (Note 1), neutron detectors are excluded from RPS RESPONSE TIME testing because the principles of detector operation virtually ensure an instantaneous response time.

RPS RESPONSE TIME tests are conducted on a 24 month STAGGERED TEST BASIS. Note 2 requires STAGGERED TEST BASIS Frequency to be determined based on 4 channels per trip system, in lieu of the 8 channels specified in Table 3.3.1.1-1 for the MSIV Closure Function. This Frequency is based on the logic interrelationships of the various channels required to produce an RPS scram signal. The 24 month Frequency is consistent with the typical industry refueling cycle and is based upon 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. UFSAR, Section 7.2.
2. UFSAR, Section 5.2.2.2.3.
3. UFSAR, Section 6.2.1.3.2.
4. UFSAR, Chapter 15.

(continued)

BASES

REFERENCES (continued)

5. UFSAR, Section 15.4.1.
6. NEDO-23842, "Continuous Control Rod Withdrawal in the Startup Range," April 18, 1978.
7. UFSAR, Section 15.4.10.
8. UFSAR, Section 15.6.5.
9. UFSAR, Section 15.2.5.
10. P. Check (NRC) letter to G. Lainas (NRC), "BWR Scram Discharge System Safety Evaluation," December 1, 1980.
11. UFSAR, Section 15.2.3.
12. UFSAR, Section 15.2.2.
13. NEDO-30851-P-A , "Technical Specification Improvement Analyses for BWR Reactor Protection System," March 1988.
14. Technical Requirements Manual.

B 3.3 INSTRUMENTATION

B 3.3.1.2 Source Range Monitor (SRM) Instrumentation

BASES

BACKGROUND

The SRMs provide the operator with information relative to the neutron flux level at very low flux levels in the core. As such, the SRM indication is used by the operator to monitor the approach to criticality and determine when criticality is achieved. The SRMs are not fully withdrawn until the count rate is greater than a minimum allowed count rate (a control rod block is set at this condition). After SRM to intermediate range monitor (IRM) overlap is demonstrated (as required by SR 3.3.1.1.6), the SRMs are normally fully withdrawn from the core.

The SRM subsystem of the Neutron Monitoring System (NMS) consists of four channels. Each of the SRM channels can be bypassed, but only one at any given time, by the operation of a bypass switch. Each channel includes one detector that can be physically positioned in the core. Each detector assembly consists of a miniature fission chamber with associated cabling, signal conditioning equipment, and electronics associated with the various SRM functions. The signal conditioning equipment converts the current pulses from the fission chamber to analog DC currents that correspond to the count rate. Each channel also includes indication, alarm, and control rod blocks. However, this LCO specifies OPERABILITY requirements only for the monitoring and indication functions of the SRMs.

During refueling, shutdown, and low power operations, the primary indication of neutron flux levels is provided by the SRMs or special movable detectors connected to the normal SRM circuits. The SRMs provide monitoring of reactivity changes during fuel or control rod movement and give the control room operator early indication of unexpected subcritical multiplication that could be indicative of an approach to criticality.

APPLICABLE SAFETY ANALYSES

Prevention and mitigation of prompt reactivity excursions during refueling and low power operation is provided by LCO 3.9.1, "Refueling Equipment Interlocks"; LCO 3.1.1, "SHUTDOWN MARGIN (SDM)"; LCO 3.3.1.1, "Reactor Protection

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

System (RPS) Instrumentation"; IRM Neutron Flux - High and Average Power Range Monitor (APRM) Neutron Flux - High, Setdown Functions; and LCO 3.3.2.1, "Control Rod Block Instrumentation."

The SRMs have no safety function and are not assumed to function during any UFSAR design basis accident or transient analysis. However, the SRMs provide the only on scale monitoring of neutron flux levels during startup and refueling. Therefore, they are being retained in Technical Specifications.

LCO

During startup in MODE 2, three of the four SRM channels are required to be OPERABLE to monitor the reactor flux level prior to and during control rod withdrawal, subcritical multiplication and reactor criticality, and neutron flux level and reactor period until the flux level is sufficient to maintain the IRM on Range 3 or above. All but one of the channels are required in order to provide a representation of the overall core response during those periods when reactivity changes are occurring throughout the core.

In MODES 3 and 4, with the reactor shut down, two SRM channels provide redundant monitoring of flux levels in the core.

In MODE 5, during a spiral offload or reload, an SRM outside the fueled region will no longer be required to be OPERABLE, since it is not capable of monitoring normal changes in neutron flux in the fueled region of the core. Thus, CORE ALTERATIONS are allowed in a quadrant with no OPERABLE SRM in an adjacent quadrant provided the Table 3.3.1.2-1, footnote (b), requirement that the bundles being spiral reloaded or spiral offloaded are all in a single fueled region containing at least one OPERABLE SRM is met. Spiral reloading and offloading encompass reloading or offloading a cell on the edge of a continuous fueled region (the cell can be reloaded or offloaded in any sequence).

In nonspiral routine operations, two SRMs are required to be OPERABLE to provide redundant monitoring of reactivity changes occurring in the reactor core. Because of the local nature of reactivity changes during refueling, adequate

(continued)

BASES

LCO (continued)

coverage is provided by requiring one SRM to be OPERABLE in the quadrant of the reactor core where CORE ALTERATIONS are being performed, and the other SRM to be OPERABLE in an adjacent quadrant containing fuel. These requirements ensure that the reactivity of the core will be continuously monitored during CORE ALTERATIONS.

Special movable detectors, according to footnote (c) of Table 3.3.1.2-1, may be used in MODE 5 in place of the normal SRM nuclear detectors. These special detectors must be connected to the normal SRM circuits in the NMS, such that the applicable neutron flux indication can be generated. These special detectors provide more flexibility in monitoring reactivity changes during fuel loading, since they can be positioned anywhere within the core during refueling. They must still meet the location requirements of SR 3.3.1.2.2 and all other required SRs for SRMs.

For an SRM channel to be considered OPERABLE, it must be providing neutron flux monitoring indication. In addition, in MODE 5, the required SRMs must be inserted to the normal operating level and be providing continuous visual indication in the control room.

APPLICABILITY

The SRMs are required to be OPERABLE in MODE 2 prior to the IRMs being on scale on Range 3, and MODES 3, 4, and 5 to provide for neutron monitoring. In MODE 1, the APRMs provide adequate monitoring of reactivity changes in the core; therefore, the SRMs are not required. In MODE 2, with IRMs on Range 3 or above, the IRMs provide adequate monitoring and the SRMs are not required.

ACTIONS

A.1 and B.1

In MODE 2, with the IRMs on Range 2 or below, SRMs provide the means of monitoring core reactivity and criticality. With any number of the required SRMs inoperable, the ability to monitor neutron flux is degraded. Therefore, a limited time is allowed to restore the inoperable channels to OPERABLE status.

(continued)

ACTIONS

A.1 and B.1 (continued)

Provided at least one SRM remains OPERABLE, Required Action A.1 allows 4 hours to restore the required SRMs to OPERABLE status. This time is reasonable because there is adequate capability remaining to monitor the core, there is limited risk of an event during this time, and there is sufficient time to take corrective actions to restore the required SRMs to OPERABLE status or to establish alternate IRM monitoring capability. During this time, control rod withdrawal and power increase is not precluded by this Required Action. Having the ability to monitor the core with at least one SRM, proceeding to IRM Range 3 or greater (with overlap required by SR 3.3.1.1.6), and thereby exiting the Applicability of this LCO, is acceptable for ensuring adequate core monitoring and allowing continued operation.

With three required SRMs inoperable, Required Action B.1 allows no positive changes in reactivity (control rod withdrawal must be immediately suspended) due to inability to monitor the changes. Required Action A.1 still applies and allows 4 hours to restore monitoring capability prior to requiring control rod insertion. This allowance is based on the limited risk of an event during this time, provided that no control rod withdrawals are allowed, and the desire to concentrate efforts on repair, rather than to immediately shut down, with no SRMs OPERABLE.

C.1

In MODE 2 with the IRMs on Range 2 or below, if the required number of SRMs is not restored to OPERABLE status within the allowed Completion Time, the reactor shall be placed in MODE 3. With all control rods fully inserted, the core is in its least reactive state with the most margin to criticality. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES

ACTIONS (continued)

D.1 and D.2

With one or more required SRMs inoperable in MODE 3 or 4, the neutron flux monitoring capability is degraded or nonexistent. The requirement to fully insert all insertable control rods ensures that the reactor will be at its minimum reactivity level while no neutron monitoring capability is available. Placing the reactor mode switch in the shutdown position prevents subsequent control rod withdrawal by maintaining a control rod block. The allowed Completion Time of 1 hour is sufficient to accomplish the Required Action, and takes into account the low probability of an event requiring the SRM occurring during this interval.

E.1 and E.2

With one or more required SRMs inoperable in MODE 5, the ability to detect local reactivity changes in the core during refueling is degraded. CORE ALTERATIONS must be immediately suspended and action must be immediately initiated to fully insert all insertable control rods in core cells containing one or more fuel assemblies. Suspending CORE ALTERATIONS prevents the two most probable causes of reactivity changes, fuel loading and control rod withdrawal, from occurring. Inserting all insertable control rods ensures that the reactor will be at its minimum reactivity given that fuel is present in the core. Suspension of CORE ALTERATIONS shall not preclude completion of the movement of a component to a safe, conservative position.

Action (once required to be initiated) to insert control rods must continue until all insertable rods in core cells containing one or more fuel assemblies are inserted.

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs for each SRM Applicable MODE or other specified conditions are found in the SRs column of Table 3.3.1.2-1.

SR 3.3.1.2.1 and SR 3.3.1.2.3

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.1 and SR 3.3.1.2.3 (continued)

CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on another channel. 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.

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 of once every 12 hours for SR 3.3.1.2.1 is based on operating experience that demonstrates channel failure is rare. While in MODES 3 and 4, reactivity changes are not expected; therefore, the 12 hour Frequency is relaxed to 24 hours for SR 3.3.1.2.3. 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 3.3.1.2.2

To provide adequate coverage of potential reactivity changes in the core, one SRM is required to be OPERABLE in the quadrant where CORE ALTERATIONS are being performed, and the other OPERABLE SRM must be in an adjacent quadrant containing fuel. Note 1 states that the SR is required to be met only during CORE ALTERATIONS. It is not required to be met at other times in MODE 5 since core reactivity changes are not occurring. This Surveillance consists of a review of plant logs to ensure that SRMs required to be OPERABLE for given CORE ALTERATIONS are, in fact, OPERABLE. In the event that only one SRM is required to be OPERABLE, per Table 3.3.1.2-1, footnote (b), only the a. portion of

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.2 (continued)

this SR is effectively required. Note 2 clarifies that more than one of the three requirements can be met by the same OPERABLE SRM. The 12 hour Frequency is based upon operating experience and supplements operational controls over refueling activities that include steps to ensure that the SRMs required by the LCO are in the proper quadrant.

SR 3.3.1.2.4

This Surveillance consists of a verification of the SRM instrument readout to ensure that the SRM reading is greater than a specified minimum count rate with the detector full in, which ensures that the detectors are indicating count rates indicative of neutron flux levels within the core. With few fuel assemblies loaded, the SRMs will not have a high enough count rate to satisfy the SR. Therefore, allowances are made for loading sufficient "source" material, in the form of irradiated fuel assemblies, to establish the minimum count rate.

To accomplish this, the SR is modified by a Note that states that the count rate is not required to be met on an SRM that has less than or equal to four fuel assemblies adjacent to the SRM and no other fuel assemblies are in the associated core quadrant. With four or less fuel assemblies loaded around each SRM and no other fuel assemblies in the associated core quadrant, even with a control rod withdrawn, the configuration will not be critical. When movable detectors are being used, detector location must be selected such that each group of fuel assemblies is separated by at least two fuel cells from any other fuel assemblies.

The Frequency is based upon channel redundancy and other information available in the control room, and ensures that the required channels are frequently monitored while core reactivity changes are occurring. When no reactivity changes are in progress, the Frequency is relaxed from 12 hours to 24 hours.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.2.5 and SR 3.3.1.2.6

Performance of a CHANNEL FUNCTIONAL TEST demonstrates the associated channel will function properly. SR 3.3.1.2.5 is required in MODE 5, and the 7 day Frequency ensures that the channels are OPERABLE while core reactivity changes could be in progress. This Frequency is reasonable, based on operating experience and on other Surveillances (such as a CHANNEL CHECK), that ensure proper functioning between CHANNEL FUNCTIONAL TESTS.

SR 3.3.1.2.6 is required to be met in MODE 2 with IRMs on Range 2 or below, and in MODES 3 and 4. Since core reactivity changes do not normally take place in MODES 3 and 4 and core reactivity changes are due only to control rod movement in MODE 2, the Frequency is extended from 7 days to 31 days. The 31 day Frequency is based on operating experience and on other Surveillances (such as CHANNEL CHECK) that ensure proper functioning between CHANNEL FUNCTIONAL TESTS.

Verification of the signal to noise ratio also ensures that the detectors are inserted to an acceptable operating level. In a fully withdrawn condition, the detectors are sufficiently removed from the fueled region of the core to essentially eliminate neutrons from reaching the detector. Any count rate obtained while the detectors are fully withdrawn is assumed to be “noise” only.

With few fuel assemblies loaded, the SRMs will not have a high enough count rate to determine the signal to noise ratio. Therefore, allowances are made for loading sufficient "source" material, in the form of irradiated fuel assemblies, to establish the conditions necessary to determine the signal to noise ratio. To accomplish this, SR 3.3.1.2.5 is modified by a Note that states that the determination of signal to noise ratio is not required to be met on an SRM that has less than or equal to four fuel assemblies adjacent to the SRM and no other fuel assemblies are in the associated core quadrant. With four or less fuel assemblies loaded around each SRM and no other fuel assemblies in the associated quadrant, even with a control rod withdrawn the configuration will not be critical.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.5 and SR 3.3.1.2.6 (continued)

The Note to SR 3.3.1.2.6 allows the Surveillance to be delayed until entry into the specified condition of the Applicability (THERMAL POWER decreased to IRM Range 2 or below). The SR must be performed within 12 hours after IRMs are on Range 2 or below. The allowance to enter the Applicability with the 31 day Frequency not met is reasonable, based on the limited time of 12 hours allowed after entering the Applicability and the inability to perform the Surveillance while at higher power levels. Although the Surveillance could be performed while on IRM Range 3, the plant would not be expected to maintain steady state operation at this power level. In this event, the 12 hour Frequency is reasonable, based on the SRMs being otherwise verified to be OPERABLE (i.e., satisfactorily performing the CHANNEL CHECK) and the time required to perform the Surveillances.

SR 3.3.1.2.7

Performance of a CHANNEL CALIBRATION at a Frequency of 24 months verifies the performance of the SRM detectors and associated circuitry. The Frequency considers the plant conditions required to perform the test, the ease of performing the test, and the likelihood of a change in the system or component status. The neutron detectors are excluded from the CHANNEL CALIBRATION (Note 1) because they cannot readily be adjusted. The detectors are fission chambers that are designed to have a relatively constant sensitivity over the range and with an accuracy specified for a fixed useful life.

Note 2 to SR 3.3.1.2.6 allows the Surveillance to be delayed until entry into the specified condition of the Applicability. The SR must be performed in MODE 2 within 12 hours of entering MODE 2 with IRMs on Range 2 or below. The allowance to enter the Applicability with the 24 month Frequency not met is reasonable, based on the limited time of 12 hours allowed after entering the Applicability and the inability to perform the Surveillance while at higher power

(continued)

BASES

SURVEILLANCE REQUIREMENTS	<u>SR 3.3.1.2.7</u> (continued) levels. Although the Surveillance could be performed while on IRM Range 3, the plant would not be expected to maintain steady state operation at this power level. In this event, the 12 hour Frequency is reasonable, based on the SRMs being otherwise verified to be OPERABLE (i.e., satisfactorily performing the CHANNEL CHECK) and the time required to perform the Surveillances.
REFERENCES	None.

B 3.3 INSTRUMENTATION

B 3.3.2.1 Control Rod Block Instrumentation

BASES

BACKGROUND

Control rods provide the primary means for control of reactivity changes. Control rod block instrumentation includes channel sensors, logic circuitry, switches, and relays that are designed to ensure that specified fuel design limits are not exceeded for postulated transients and accidents. During high power operation, the rod block monitor (RBM) provides protection for control rod withdrawal error events. During low power operations, control rod blocks from the rod worth minimizer (RWM) enforce specific control rod sequences designed to mitigate the consequences of the control rod drop accident (CRDA). During shutdown conditions, control rod blocks from the Reactor Mode Switch – Shutdown Position Function ensure that all control rods remain inserted to prevent inadvertent criticalities.

The purpose of the RBM is to limit control rod withdrawal if localized neutron flux exceeds a predetermined setpoint during control rod manipulations (Ref. 1). It is assumed to function to block further control rod withdrawal to preclude a MCPR Safety Limit (SL) violation. The RBM supplies a trip signal to the Reactor Manual Control System (RMCS) to appropriately inhibit control rod withdrawal during power operation above the 30% RATED THERMAL POWER setpoint when a non-peripheral control rod is selected. The RBM has two channels, either of which can initiate a control rod block when the channel output exceeds the control rod block setpoint. One RBM channel inputs into one RMCS rod block circuit and the other RBM channel inputs into the second RMCS rod block circuit. The RBM channel signal is generated by averaging a set of local power range monitor (LPRM) signals. One RBM channel averages the signals from LPRM detectors at the A and C positions in the assigned LPRM assemblies, while the other RBM channel averages the signals from LPRM detectors at the B and D positions. Assignment of LPRM assemblies to be used in RBM averaging is controlled by the selection of control rods. The RBM is automatically bypassed and the output set to zero if a peripheral rod is selected or the APRM used to normalize the RBM reading is < 30% RTP. If any LPRM detector assigned to an RBM is

(continued)

BASES

BACKGROUND (continued)

bypassed, the computed average signal is automatically adjusted to compensate for the number of LPRM input signals. The minimum number of LPRM inputs required for each RBM channel to prevent an instrument inoperative alarm is four when using four LPRM assemblies, three when using three LPRM assemblies, and two when using two LPRM assemblies. Each RBM also receives a recirculation loop flow signal from the associated flow converter.

With no control rod selected, the RBM output is set to zero. However, when a control rod is selected, the gain of each RBM channel output is normalized to a reference APRM. The gain setting is held constant during the movement of that particular control rod to provide an indication of the change in the relative local power level. If the indicated power increases above the preset limit, a rod block will occur. In addition, to preclude rod movement with an inoperable RBM, a downscale trip and an inoperable trip are provided.

The purpose of the RWM is to control rod patterns during startup and shutdown, such that only specified control rod sequences and relative positions are allowed over the operating range from all control rods inserted to 10% RTP. The sequences effectively limit the potential amount and rate of reactivity increase during a CRDA. A prescribed control rod sequence is stored in the RWM, which will initiate control rod withdrawal and insert blocks when the actual sequence deviates beyond allowances from the stored sequence. The RWM determines the actual sequence based on position indication for each control rod. The RWM also uses feedwater flow and steam flow signals to determine when the reactor power is above the preset power level at which the RWM is automatically bypassed (Ref. 2). The RWM is a single channel system that provides input into both RMCS rod block circuits.

With the reactor mode switch in the shutdown position, a control rod withdrawal block is applied to all control rods to ensure that the shutdown condition is maintained. This Function prevents inadvertent criticality as the result of a control rod withdrawal during MODE 3 or 4, or during MODE 5 when the reactor mode switch is required to be in the

(continued)

BASES

BACKGROUND (continued)

shutdown position. The reactor mode switch has two channels, each inputting into a separate RMCS rod block circuit. A rod block in either RMCS circuit will provide a control rod block to all control rods.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1. Rod Block Monitor

The RBM is designed to prevent violation of the MCPR SL and the cladding 1% plastic strain fuel design limit that may result from a single control rod withdrawal error (RWE) event. The analytical methods and assumptions used in evaluating the RWE event are summarized in Reference 3. The cycle-specific analysis considers the continuous withdrawal of the maximum worth control rod at its maximum drive speed from the reactor, which is operating at rated power with a control rod pattern that results in the core being placed on thermal design limits. The condition is analyzed to ensure that the results obtained are conservative; the approach also serves to demonstrate the functions of the RBM.

The RBM Function satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

Two channels of the RBM are required to be OPERABLE, with their setpoints within the appropriate Allowable Values specified in the CORE OPERATING LIMITS REPORT to ensure that no single instrument failure can preclude a rod block from this Function. The actual setpoints are calibrated consistent with applicable setpoint methodology.

Nominal trip setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure that the setpoints do not exceed the Allowable Values 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 power), 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

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1. Rod Block Monitor (continued)

from the safety analysis. The trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. 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 and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

The RBM is assumed to mitigate the consequences of an RWE event when operating ≥ 30% RTP and a non-peripheral control rod is selected. Below this power level, or if a peripheral control rod is selected, the consequences of an RWE event will not exceed the MCPR SL and, therefore, the RBM is not required to be OPERABLE (Ref. 3).

2. Rod Worth Minimizer

The RWM enforces the analyzed rod position sequence to ensure that the initial conditions of the CRDA analysis are not violated. The analytical methods and assumptions used in evaluating the CRDA are summarized in References 4, 5, 6, 7, and 8. The analyzed rod position sequence requires that control rods be moved in groups, with all control rods assigned to a specific group required to be within specified banked positions. Requirements that the control rod sequence is in compliance with the analyzed rod position sequence are specified in LCO 3.1.6, "Rod Pattern Control."

The RWM Function satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

Since the RWM is a system designed to act as a backup to operator control of the rod sequences, only one channel of

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2. Rod Worth Minimizer (continued)

the RWM is available and required to be OPERABLE (Ref. 9). Special circumstances provided for in the Required Action of LCO 3.1.3, "Control Rod OPERABILITY," and LCO 3.1.6 may necessitate bypassing the RWM to allow continued operation with inoperable control rods, or to allow correction of a control rod pattern not in compliance with the analyzed rod position sequence. The RWM may be bypassed as required by these conditions, but then it must be considered inoperable and the Required Actions of this LCO followed.

Compliance with the analyzed rod position sequence, and therefore OPERABILITY of the RWM, is required in MODES 1 and 2 when THERMAL POWER is ≤ 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 280 cal/gm fuel design limit during a CRDA (Refs. 9 and 10). 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.

3. Reactor Mode Switch – Shutdown Position

During MODES 3 and 4, and during MODE 5 when the reactor mode switch is in the shutdown position, the core is assumed to be subcritical; therefore, no positive reactivity insertion events are analyzed. The Reactor Mode Switch – Shutdown Position control rod withdrawal block ensures that the reactor remains subcritical by blocking control rod withdrawal, thereby preserving the assumptions of the safety analysis.

The Reactor Mode Switch – Shutdown Position Function satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

Two channels are required to be OPERABLE to ensure that no single channel failure will preclude a rod block when required. There is no Allowable Value for this Function since the channels are mechanically actuated based solely on reactor mode switch position.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3. Reactor Mode Switch - Shutdown Position (continued)

During shutdown conditions (MODES 3 and 4, and MODE 5 when the reactor mode switch is in the shutdown position), no positive reactivity insertion events are analyzed because assumptions are that control rod withdrawal blocks are provided to prevent criticality. Therefore, when the reactor mode switch is in the shutdown position, the control rod withdrawal block is required to be OPERABLE. During MODE 5 with the reactor mode switch in the refueling position, the refuel position one-rod-out interlock (LCO 3.9.2, "Refuel Position One-Rod-Out Interlock") provides the required control rod withdrawal blocks.

ACTIONS

A.1

With one RBM channel inoperable, the remaining OPERABLE channel is adequate to perform the control rod block function; however, overall reliability is reduced because a single failure in the remaining OPERABLE channel can result in no control rod block capability for the RBM. For this reason, Required Action A.1 requires restoration of the inoperable channel to OPERABLE status. The Completion Time of 24 hours is based on the low probability of an event occurring coincident with a failure in the remaining OPERABLE channel.

B.1

If Required Action A.1 is not met and the associated Completion Time has expired, the inoperable channel must be placed in trip within 1 hour. If both RBM channels are inoperable, the RBM is not capable of performing its intended function; thus, one channel must also be placed in trip. This initiates a control rod withdrawal block, thereby ensuring that the RBM function is met.

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

(continued)

BASES

ACTIONS (continued)

C.1, C.2.1.1, C.2.1.2, and C.2.2

With the RWM inoperable during a reactor startup, the operator is still capable of enforcing the prescribed control rod sequence. However, the overall reliability is reduced because a single operator error can result in violating the control rod sequence. Therefore, control rod movement must be immediately suspended except by scram. Alternatively, startup may continue if at least 12 control rods have already been withdrawn, or a reactor startup with an inoperable RWM during withdrawal of one or more of the first 12 control rods was not performed in the last calendar year (i.e., the current calendar year). These requirements minimize the number of reactor startups initiated with the RWM inoperable. Required Actions C.2.1.1 and C.2.1.2 require verification of these conditions by review of plant logs and control room indications. Once Required Action C.2.1.1 or C.2.1.2 is satisfactorily completed, control rod withdrawal may proceed in accordance with the restrictions imposed by Required Action C.2.2. Required Action C.2.2 allows for the RWM Function to be performed manually and requires a double check of compliance with the prescribed rod sequence by a second licensed operator (Reactor Operator or Senior Reactor Operator) or other task qualified member of the technical staff (e.g., shift technical advisor or reactor engineer).

The RWM may be bypassed under these conditions to allow continued operations. In addition, Required Actions of LCO 3.1.3 and LCO 3.1.6 may require bypassing the RWM, during which time the RWM must be considered inoperable with Condition C entered and its Required Actions taken.

D.1

With the RWM inoperable during a reactor shutdown, the operator is still capable of enforcing the prescribed control rod sequence. Required Action D.1 allows for the RWM Function to be performed manually and requires a double check of compliance with the prescribed rod sequence by a second licensed operator (Reactor Operator or Senior Reactor Operator) or other task qualified member of the technical

(continued)

BASES

ACTIONS

D.1 (continued)

staff (e.g., shift technical advisor or reactor engineer). The RWM may be bypassed under these conditions to allow the reactor shutdown to continue.

E.1 and E.2

With one Reactor Mode Switch — Shutdown Position control rod withdrawal block channel inoperable, the remaining OPERABLE channel is adequate to perform the control rod withdrawal block function. However, since the Required Actions are consistent with the normal action of an OPERABLE Reactor Mode Switch - Shutdown Position Function (i.e., maintaining all control rods inserted), there is no distinction between having one or two channels inoperable.

In both cases (one or both channels inoperable), suspending all control rod withdrawal and initiating action to fully insert all insertable control rods in core cells containing one or more fuel assemblies will ensure that the core is subcritical with adequate SDM ensured by LCO 3.1.1. Control rods in core cells containing no fuel assemblies do not affect the reactivity of the core and are therefore not required to be inserted. Action must continue until all insertable control rods in core cells containing one or more fuel assemblies are fully inserted.

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs for each Control Rod Block instrumentation Function are found in the SRs column of Table 3.3.2.1-1.

The Surveillances are modified by a second Note to indicate that when an RBM 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 control rod block 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. 11)

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

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 a control rod block will be initiated when necessary.

SR 3.3.2.1.1

A CHANNEL FUNCTIONAL TEST is performed for each RBM channel to ensure that the entire channel will perform the intended function. It includes the Reactor Manual Control "Relay Select Marix" System input.

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology. The Frequency of 92 days is based on reliability analyses (Ref. 12).

SR 3.3.2.1.2 and SR 3.3.2.1.3

A CHANNEL FUNCTIONAL TEST is performed for the RWM to ensure that the entire system will perform the intended function. The CHANNEL FUNCTIONAL TEST for the RWM is performed by attempting to withdraw a control rod not in compliance with the prescribed sequence and verifying a control rod block occurs and by attempting to select a control rod not in compliance with the prescribed sequence and verifying a selection error occurs. As noted in the SRs, SR 3.3.2.1.2 is not required to be performed until 1 hour after any control rod is withdrawn at ≤ 10% RTP in MODE 2, and SR 3.3.2.1.3 is not required to be performed until 1 hour after THERMAL POWER is ≤ 10% RTP in MODE 1. This allows entry into MODE 2 (and if entering during a shutdown, concurrent power reduction to ≤ 10% RTP) for SR 3.3.2.1.2, and THERMAL POWER reduction to ≤ 10% RTP in MODE 1 for SR 3.3.2.1.3, to perform the required Surveillances if the 92 day Frequency is not met per SR 3.0.2. The 1 hour allowance is based on operating experience and in consideration of providing a reasonable time in which to complete the SRs. Operating experience has shown that these components usually pass the Surveillance when performed at the 92 day Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.1.4

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.

As noted, neutron detectors are excluded from the CHANNEL CALIBRATION because they are passive devices, with minimal drift, and because of the difficulty of simulating a meaningful signal. Neutron detectors are adequately tested in SR 3.3.1.1.2 and SR 3.3.1.1.8.

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 3.3.2.1.5

The RBM is automatically bypassed when power is below a specified value or if a peripheral control rod is selected. The power level is determined from the APRM signals input to each RBM channel. The automatic bypass setpoint must be verified periodically to be < 30% RTP. In addition, it must also be verified that the RBM is not bypassed when a control rod that is not a peripheral control rod is selected (only one non-peripheral control rod is required to be verified). If any bypass setpoint is nonconservative, then the affected RBM channel is considered inoperable. Alternatively, the APRM channel can be placed in the conservative condition to enable the RBM. If placed in this condition, the SR is met and the RBM channel is not considered inoperable. As noted, neutron detectors are excluded from the Surveillance because they are passive devices, with minimal drift, and because of the difficulty of simulating a meaningful signal. Neutron detectors are adequately tested in SR 3.3.1.1.2 and SR 3.3.1.1.8. The 24 month Frequency is based on the actual trip setpoint methodology utilized for these channels.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.1.6

The RWM is automatically bypassed when power is above a specified value. The power level is determined from feedwater flow and steam flow signals. The automatic bypass setpoint must be verified periodically to be > 10% RTP. If the RWM low power setpoint is nonconservative, then the RWM is considered inoperable. Alternately, the low power setpoint channel can be placed in the conservative condition (nonbypass). If placed in the nonbypassed condition, the SR is met and the RWM is not considered inoperable. The Frequency is based on the trip setpoint methodology utilized for the low power setpoint channel.

SR 3.3.2.1.7

A CHANNEL FUNCTIONAL TEST is performed for the Reactor Mode Switch – Shutdown Position Function to ensure that the entire channel will perform the intended function. The CHANNEL FUNCTIONAL TEST for the Reactor Mode Switch – Shutdown Position Function is performed by attempting to withdraw any control rod with the reactor mode switch in the shutdown position and verifying a control rod block occurs.

As noted in the SR, the Surveillance is not required to be performed until 1 hour after the reactor mode switch is in the shutdown position, since testing of this interlock with the reactor mode switch in any other position cannot be performed without using jumpers, lifted leads, or movable links. This allows entry into MODES 3 and 4 if the 24 month Frequency is not met per SR 3.0.2. The 1 hour allowance is based on operating experience and in consideration of providing a reasonable time in which to complete the SRs.

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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.1.8

The RWM will only enforce the proper control rod sequence if the rod sequence is properly input into the RWM computer. This SR ensures that the proper sequence is loaded into the RWM so that it can perform its intended function. The Surveillance is performed once prior to declaring RWM OPERABLE following loading of sequence into RWM, since this is when rod sequence input errors are possible.

SR 3.3.2.1.9

LCO 3.1.3 and LCO 3.1.6 may require individual control rods to be bypassed in the RWM to allow insertion of an inoperable control rod or correction of a control rod pattern not in compliance with the analyzed rod position sequence. With the control rods bypassed in the RWM, the RWM will not control the movement of these bypassed control rods. To ensure the proper bypassing and movement of these affected control rods, a second licensed operator (Reactor Operator or Senior Reactor Operator) or other task qualified member of the technical staff (e.g., shift technical advisor or reactor engineer) must verify the bypassing and position of these control rods. Compliance with this SR allows the RWM to be OPERABLE with these control rods bypassed.

REFERENCES

1. UFSAR, Section 7.6.1.5.3.
2. UFSAR, Section 7.7.2.
3. UFSAR, Section 15.4.2.3.
4. UFSAR, Section 15.4.10.
5. XN-NF-80-19(P)(A), Volume 1, Supplement 2, Section 7.1 Exxon Nuclear Methodology for Boiling Water Reactor-Neutronics Methods for Design and Analysis, (as specified in Technical Specification 5.6.5).
6. NEDE-24011-P-A, "GE Standard Application for Reactor Fuel," (as specified in Technical Specification 5.6.5).

(continued)

BASES

REFERENCES (continued)

7. Letter to T.A. Pickens (BWROG) from G.C. Lainas (NRC), "Amendment 17 to General Electric Licensing Topical Report NEDE-24011-P-A," BWROG-8644, August 15, 1986.

8. NFSR-0091, Benchmark of CASMO/MICROBURN BWR Nuclear Design Methods, Commonwealth Edison Topical Report, (as specified in Technical Specification 5.6.5).

9. NRC SER, "Acceptance of Referencing of Licensing Topical Report NEDE-24011-P-A," "General Electric Standard Application for Reactor Fuel, Revision 8, Amendment 17," December 27, 1987.

10. "Modifications to the Requirements for Control Rod Drop Accident Mitigating Systems," BWR Owners' Group, July 1986.

11. GENE-770-06-1-A, "Addendum to Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," December 1992.

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

B 3.3 INSTRUMENTATION

B 3.3.2.2 Feedwater System and Main Turbine High Water Level Trip Instrumentation

BASES

BACKGROUND

The Feedwater System and Main Turbine High Water Level Trip Instrumentation is designed to detect a potential failure of the Feedwater Level Control System that causes excessive feedwater flow.

With excessive feedwater flow, the water level in the reactor vessel rises toward the high water level reference point, causing the trip of the three feedwater pumps and the main turbine.

Reactor Vessel Water Level — High signals are provided by differential pressure indicating switches 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 in the reactor vessel (variable leg). Two channels of Reactor Vessel Water Level — High instrumentation are provided as input to a two-out-of-two initiation logic that trips the three feedwater pumps and the main turbine. 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 feedwater pump and main turbine trip signal to the trip logic.

A trip of the feedwater pumps limits further increase in reactor vessel water level by limiting further addition of feedwater to the reactor vessel. A trip of the main turbine and closure of the stop valves protects the turbine from damage due to water entering the turbine.

APPLICABLE SAFETY ANALYSES

The Feedwater System and Main Turbine High Water Level Trip Instrumentation is assumed to be capable of providing a feedwater pump and main turbine trip in the design basis transient analysis for a feedwater controller failure, maximum demand event (Ref. 1). The high level trip indirectly initiates a reactor scram from the main turbine trip (above 45% RTP) and trips the feedwater pumps, thereby terminating the event. The reactor scram mitigates the reduction in MCPR.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Feedwater System and Main Turbine High Water Level Trip Instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO requires two channels of the Reactor Vessel Water Level — High instrumentation to be OPERABLE to trip the feedwater pumps and main turbine trip on a valid high level signal. Two channels are needed to provide trip signals in order for the feedwater pump and main turbine trips to occur. Each channel must have its setpoint set within the specified Allowable Value of SR 3.3.2.2.3. The Allowable Value is set to ensure that the thermal limits are not exceeded during the event. 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 (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 trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument uncertainties, process effects,

(continued)

BASES

LCO (continued)

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 and appropriately applied for the instrumentation.

APPLICABILITY

The Feedwater System and Main Turbine High Water Level Trip Instrumentation is required to be OPERABLE at ≥ 25% RTP to ensure that the fuel cladding integrity Safety Limit and the cladding 1% plastic strain limit are not violated during the feedwater controller failure, maximum demand event. As discussed in the Bases for LCO 3.2.1, "AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)," LCO 3.2.2, "MINIMUM CRITICAL POWER RATIO (MCPR)," LCO 3.2.3, "LINEAR HEAT GENERATION RATE," and LCO 3.2.4, "Average Power Range Monitor (APRM) Gain and Setpoint," sufficient margin to these limits exists below 25% RTP; therefore, these requirements are only necessary when operating at or above this power level.

ACTIONS

A.1

With one or more channels inoperable, the Feedwater System and Main Turbine High Water Level Trip Instrumentation cannot perform its design function (Feedwater System and main turbine high water level trip capability is not maintained). Therefore, continued operation is only permitted for a 2 hour period, during which Feedwater System and main turbine high water level trip capability must be restored. The trip capability is considered maintained when sufficient channels are OPERABLE or in trip such that the Feedwater System and main turbine high water level trip logic will generate a trip signal on a valid signal. This requires two channels to each be OPERABLE or in trip. If the required channels cannot be restored to OPERABLE status or placed in trip, Condition B must be entered and its Required Action taken.

The 2 hour Completion Time is sufficient for the operator to take corrective action, and takes into account the likelihood of an event requiring actuation of Feedwater System and Main Turbine High Water Level Trip Instrumentation occurring during this period. It is also consistent with the 2 hour Completion Time provided in LCO 3.2.2 for Required Action A.1, since this instrumentation's purpose is to preclude a MCPR violation.

(continued)

ACTIONS (continued)

B.1 and B.2

With a channel not restored to OPERABLE status or placed in trip, THERMAL POWER must be reduced to < 25% RTP within 4 hours. As discussed in the Applicability section of the Bases, operation below 25% RTP results in sufficient margin to the required limits, and the Feedwater System and Main Turbine High Water Level Trip Instrumentation is not required to protect fuel integrity during the feedwater controller failure, maximum demand event. Alternatively; if a channel is inoperable solely due to an inoperable feedwater pump breaker, the affected feedwater pump breaker may be removed from service since this performs the intended function of the instrumentation. The allowed Completion Time of 4 hours is based on operating experience to reduce THERMAL POWER to < 25% RTP from full power conditions 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 associated Conditions and Required Actions may be delayed for up to 2 hours. Upon completion of the Surveillance, or expiration of the 2 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken.

SR 3.3.2.2.1

Performance of the CHANNEL CHECK once every 24 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 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.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.2.2.1 (continued)

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 limits.

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 the channels required by the LCO.

SR 3.3.2.2.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 92 days is based on operating experience.

SR 3.3.2.2.3

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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.2.2.4

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required trip logic for a specific channel. The system functional test of the feedwater pump breakers and main turbine stop valves 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 main turbine stop valve or feedwater pump breaker is incapable of operating, the associated instrumentation would also 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 that these components usually pass the Surveillance when performed at the 24 month Frequency.

REFERENCES

1. UFSAR, Section 15.1.2.

B 3.3 INSTRUMENTATION

B 3.3.3.1 Post Accident Monitoring (PAM) Instrumentation

BASES

BACKGROUND

The primary purpose of the PAM instrumentation is to display, in the control room, plant variables that provide information required by the control room operators during accident situations. This information provides the necessary support for the operator to take the manual actions for which no automatic control is provided and that are required for safety systems to accomplish their safety functions for Design Basis Events. The instruments that monitor these variables are designated as Type A, Category I, and non-Type A, Category I, in accordance with Regulatory Guide 1.97 (Ref. 1).

The OPERABILITY of the accident monitoring instrumentation ensures that there is sufficient information available on selected plant parameters to monitor and assess plant status and behavior following an accident. This capability is consistent with the recommendations of Reference 1.

APPLICABLE SAFETY ANALYSES

The PAM instrumentation LCO ensures the OPERABILITY of Regulatory Guide 1.97, Type A variables so that the control room operating staff can:

- Perform the diagnosis specified in the Emergency Operating Procedures (EOPs). These variables are restricted to preplanned actions for the primary success path of Design Basis Accidents (DBAs), (e.g., loss of coolant accident (LOCA)), and
- Take the specified, preplanned, manually controlled actions for which no automatic control is provided, which are required for safety systems to accomplish their safety function.

The PAM instrumentation LCO also ensures OPERABILITY of Category I, non-Type A, variables so that the control room operating staff can:

- Determine whether systems important to safety are performing their intended functions;

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

- Determine the potential for causing a gross breach of the barriers to radioactivity release;
- Determine whether a gross breach of a barrier has occurred; and
- Initiate action necessary to protect the public and for an estimate of the magnitude of any impending threat.

The plant specific Regulatory Guide 1.97 Analysis (Ref. 2) documents the process that identified Type A and Category I, non-Type A, variables.

Accident monitoring instrumentation that satisfies the definition of Type A in Regulatory Guide 1.97 meets Criterion 3 of 10 CFR 50.36(c)(2)(ii). Category I, non-Type A, instrumentation is retained in Technical Specifications (TS) because they are intended to assist operators in minimizing the consequences of accidents. Therefore, these Category I variables are important for reducing public risk.

LCO

LCO 3.3.3.1 requires two OPERABLE channels for all but one Function to ensure that no single failure prevents the operators from being presented with the information necessary to determine the status of the plant and to bring the plant to, and maintain it in, a safe condition following an accident. Furthermore, providing two channels allows a CHANNEL CHECK during the post accident phase to confirm the validity of displayed information.

The exception to the two channel requirement is primary containment isolation valve (PCIV) position. In this case, the important information is the status of the primary containment penetrations. The LCO requires one position indicator for each active (e.g., automatic) PCIV. This is sufficient to redundantly verify the isolation status of each isolable penetration either via indicated status of the active valve and prior knowledge of passive valve or via system boundary status. If a normally active PCIV is known to be closed and deactivated, position indication is not needed to determine status. Therefore, the position indication for closed and deactivated valves is not required to be OPERABLE.

(continued)

BASES

LCO (continued)

The following list is a discussion of the specified instrument Functions listed in Table 3.3.3.1-1.

1. Reactor Vessel Pressure

Reactor vessel pressure is a Type A and Category I variable provided to support monitoring of Reactor Coolant System (RCS) integrity and to verify operation of the Emergency Core Cooling Systems (ECCS). Two independent pressure transmitters with a range of 0 psig to 1500 psig monitor pressure and provide pressure indication to the control room. The output from one of these channels is recorded on an independent pen recorder and the other channel output is directed to an indicator. The wide range recorder and indicator are the primary indications used by the operator during an accident. Therefore, the PAM Specification deals specifically with this portion of the instrument channel.

2. Reactor Vessel Water Level

Reactor vessel water level is a Type A and Category I variable provided to support monitoring of core cooling and to verify operation of the ECCS. Two different range channels, wide range and narrow range, provide the PAM Reactor Vessel Water Level Function. The wide range water level channels measure from approximately 202 inches above the top of active fuel to approximately 198 inches below the top of active fuel while the narrow range channels measure from approximately 82 inches above the top of active fuel to approximately 202 inches above the top of active fuel. Wide range water level is measured by two independent differential pressure transmitters. The output from one of these channels is recorded on an independent pen recorder and the other output is directed to an indicator. Narrow range level is measured by two independent differential pressure transmitters. The output from these channels is directed to two independent indicators. These instruments are the primary indications used by the operator during an accident. Therefore, the PAM Specification deals specifically with this portion of the instrument channel.

(continued)

BASES

LCO

2. Reactor Vessel Water Level (continued)

The reactor vessel water level instruments are uncompensated for variation in reactor water density and are calibrated to be most accurate at a specific vessel pressure and temperature. The wide range instruments are calibrated to be accurate at post-DBA LOCA pressure and temperature. The narrow range instruments are calibrated to be accurate at the normal operating pressure and temperature.

3. Torus Water Level

Torus water level is a Type A and Category I variable provided to detect a breach in the reactor coolant pressure boundary (RCPB). This variable is also used to verify and provide long term surveillance of ECCS function. The wide range torus water level measurement provides the operator with sufficient information to assess the status of both the RCPB and the water supply to the ECCS. The wide range water level indicators monitor the torus water level from the bottom to the top of the torus. Two wide range torus water level signals are transmitted from separate differential pressure transmitters to two control room indicators and also continuously displayed on two recorders in the control room. These instruments are the primary indication used by the operator during an accident. Therefore, the PAM Specification deals specifically with this portion of the instrument channel.

4. Drywell Pressure

Drywell pressure is a Type A and Category I variable provided to detect a breach of the RCPB and to verify ECCS functions that operate to maintain RCS integrity. Two different range channels provide the PAM Drywell Pressure Function. The wide range instruments measure from -5 psig to 250 psig while the narrow range instruments monitor between -5 psig and 70 psig. The wide range drywell pressure signals are transmitted from separate pressure transmitters and are continuously displayed on two control room recorders and indicators. Two narrow range drywell

(continued)

BASES

LCO

4. Drywell Pressure (continued)

pressure signals are transmitted from separate transmitters and are continuously displayed on independent indicators in the control room. These recorders and indicators are the primary indications used by the operator during an accident. Therefore, the PAM Specification deals specifically with this portion of the instrument channel. The drywell pressure channels also satisfy the monitoring requirement for suppression chamber (torus) pressure since the suppression chamber-to-drywell vacuum breakers ensure the suppression chamber pressure is maintained within 0.5 psig of the drywell pressure.

5. Drywell Radiation

Drywell radiation is a Category 1 variable provided to monitor the potential of significant radiation releases and to provide release assessment for use by operators in determining the need to invoke site emergency plans. Two redundant radiation sensors are located in capped drywell penetrations and have a range from 10^{0} R/hr to 10^{8} R/hr. These radiation monitors display on recorders located in the control room. Two radiation monitors/recorders are required to be OPERABLE (one per division). Therefore, the PAM Specification deals specifically with this portion of the instrument channel.

6. Penetration Flow Path Primary Containment Isolation Valve (PCIV) Position

PCIV (excluding check valves) position is a Category 1 variable provided for verification of containment integrity. In the case of PCIV position, the important information is the isolation status of the containment penetration. The LCO requires one channel of valve position indication in the control room to be OPERABLE for each active PCIV in a containment penetration flow path requiring post-accident valve position indication, i.e., two total channels of PCIV position indication for a penetration flow path with two active valves requiring post-accident valve position indication. For containment penetrations with only one

(continued)

LCO

6. Penetration Flow Path Primary Containment Isolation Valve (PCIV) Position (continued)

active PCIV having control room indication, Note (b) requires a single channel of valve position indication to be OPERABLE. This is sufficient to redundantly verify the isolation status of each isolable penetration via indicated status of the active valve, as applicable, and prior knowledge of passive valve or system boundary status. If a penetration flow path is isolated, position indication forthe PCIV(s) in the associated penetration flow path is not needed to determine status. Therefore, the position indication for valves in an isolated penetration flow path is not required to be OPERABLE. Each penetration is treated separately and each penetration flow path is considered a separate function. Therefore, separate Condition entry is allowed for each inoperable penetration flow path.

The indication for each PCIV is provided at the valve controls in the control room. Each indication consists of green and red indicator lights that illuminate to indicate whether the PCIV is fully open, fully closed, or in a mid-position. Therefore, the PAM Specification deals specifically with this portion of the instrumentation channel.

7, 8. Drywell Hydrogen and Oxygen Concentration Analyzers and Monitors

Drywell hydrogen and oxygen analyzers and monitors are Category I instruments provided to detect high hydrogen or oxygen concentration conditions that represent a potential for containment breach. This variable is also important in verifying the adequacy of mitigating actions. Hydrogen and oxygen concentrations are each measured by two independent analyzers and are monitored in the control room. The drywell hydrogen and oxygen analyzer PAM instrumentation consists of two independent gas analyzer systems. Each gas analyzer system consists of a hydrogen analyzer and an oxygen analyzer. The analyzers are capable of determining hydrogen concentration in the range of 0% to 10% and oxygen concentration in the range of 0% to 10%. Each gas analyzer

(continued)

BASES

LCO

7, 8. Drywell Hydrogen and Oxygen Concentration Analyzers and Monitors (continued)

system must be capable of sampling the drywell. There are two independent recorders in the control room to display the results. Therefore, the PAM Specification deals specifically with this portion of the instrument channel.

9. Torus Water Temperature

Torus water temperature is a Type A and Category I variable provided to detect a condition that could potentially lead to containment breach and to verify the effectiveness of ECCS actions taken to prevent containment breach. The torus water temperature instrumentation allows operators to detect trends in torus water temperature in sufficient time to take action to prevent steam quenching vibrations in the torus. Sixteen temperature sensors are arranged in two groups of eight sensors in independent and redundant channels, located such that there are two sensors (one inner and one outer) located in each of the four quadrants to assure an accurate measurement of bulk water temperature. The range of the torus water temperature channels is 0°F to 300°F.

Thus, two groups of sensors are sufficient to monitor the bulk average temperature of the torus water. Each group of eight sensors is averaged to provide two bulk temperature inputs for PAM. The averaged temperatures are recorded on two independent recorders in the control room. Both of these recorders must be OPERABLE to furnish two channels of PAM indication. These recorders are the primary indication used by the operator during an accident. Therefore, the PAM Specification deals specifically with this portion of the instrument channels.

APPLICABILITY

The PAM instrumentation LCO is applicable in MODES 1 and 2. These variables are related to the diagnosis and preplanned actions required to mitigate DBAs. The applicable DBAs are assumed to occur in MODES 1 and 2. In MODES 3, 4, and 5, plant conditions are such that the likelihood of an event that would require PAM instrumentation is extremely low; therefore, PAM instrumentation is not required to be OPERABLE in these MODES.

(continued)

BASES (continued)

ACTIONS

Note 1 has been added to the ACTIONS to exclude the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE while relying on the ACTIONS even though the ACTIONS may eventually require plant shutdown. This exception is acceptable due to the passive function of the instruments, the operator's ability to diagnose an accident using alternative instruments and methods, and the low probability of an event requiring these instruments.

Note 2 has been provided to modify the ACTIONS related to PAM 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 PAM instrumentation channels provide appropriate compensatory measures for separate Functions. As such, a Note has been provided that allows separate Condition entry for each inoperable PAM Function.

<u>A.1</u>

When one or more Functions have one required channel that is inoperable, the required inoperable channel must be restored to OPERABLE status within 30 days. The 30 day Completion Time is based on operating experience and takes into account the remaining OPERABLE channels or remaining isolation barrier (in the case of primary containment penetrations with only one PCIV), the passive nature of the instrument (no critical automatic action is assumed to occur from these instruments), and the low probability of an event requiring PAM instrumentation during this interval.

(continued)

BASES

ACTIONS (continued)

B.1

If a channel has not been restored to OPERABLE status in 30 days, this Required Action specifies initiation of action in accordance with Specification 5.6.6, which requires a written report to be submitted to the NRC. This report discusses the results of the root cause evaluation of the inoperability and identifies proposed restorative actions. This Required Action is appropriate in lieu of a shutdown requirement, since another OPERABLE channel is monitoring the Function, an alternate method of monitoring is available, and given the likelihood of plant conditions that would require information provided by this instrumentation.

C.1

When one or more Functions have two required channels that are inoperable (i.e., two channels inoperable in the same Function), one channel in the Function should be restored to OPERABLE status within 7 days. The Completion Time of 7 days is based on the relatively low probability of an event requiring PAM instrument operation and the availability of alternate means to obtain the required information. Continuous operation with two required channels inoperable in a Function is not acceptable because the alternate indications may not fully meet all performance qualification requirements applied to the PAM instrumentation. Therefore, requiring restoration of one inoperable channel of the Function limits the risk that the PAM Function will be in a degraded condition should an accident occur.

D.1

This Required Action directs entry into the appropriate Condition referenced in Table 3.3.3.1-1. The applicable Condition referenced in the Table is Function dependent. Each time an inoperable channel has not met the Required Action of Condition C and the associated Completion Time has expired, Condition D is entered for that channel and provides for transfer to the appropriate subsequent Condition.

(continued)

BASES

ACTIONS
(continued)

E.1

For the majority of Functions in Table 3.3.3.1-1, if the Required Action and associated Completion Time of Condition C is not met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 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.

F.1

Since alternate means of monitoring drywell radiation have been developed and tested, the Required Action is not to shut down the plant, but rather to follow the directions of Specification 5.6.6. These alternate means may be temporarily installed if the normal PAM channel cannot be restored to OPERABLE status within the allotted time. The report provided to the NRC should discuss the alternate means used, describe the degree to which the alternate means are equivalent to the installed PAM channels, justify the areas in which they are not equivalent, and provide a schedule for restoring the normal PAM channels.

SURVEILLANCE
REQUIREMENTS

As noted at the beginning of the SRs, the following SRs apply to each PAM instrumentation Function in Table 3.3.3.1-1, except where identified in the SR.

The Surveillances are modified by a second 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 other required channel in the associated Function is OPERABLE. 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. The 6 hour testing allowance is acceptable since it does not significantly reduce the probability of properly monitoring post-accident parameters, when necessary.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.3.1.1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel against 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 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. The high radiation instrumentation should be compared to similar plant instruments located throughout the plant.

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 sensor or the signal processing equipment has drifted outside its limit.

The Frequency of 31 days is based upon plant operating experience, with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function in any 31 day interval is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of those displays associated with the channels required by the LCO.

SR 3.3.3.1.2 and SR 3.3.3.1.3

A CHANNEL CALIBRATION is performed every 92 days for Functions 7 and 8 and every 24 months for all other functions. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies the channel responds to measured parameter with the necessary range and accuracy. For Function 5, the CHANNEL CALIBRATION shall consist of an electronic calibration of

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.3.1.2 and SR 3.3.3.1.3 (continued)

the channel, excluding the detector, for range decades > 10 R/hour and a one point calibration check of the detector with an installed or portable gamma source for the range decade < 10 R/hour. For Function 6, the CHANNEL CALIBRATION shall consist of verifying that the position indication conforms to actual valve position.

The 92 day Frequency for CHANNEL CALIBRATION of Functions 7 and 8 is based on operating experience. The 24 month Frequency for CHANNEL CALIBRATION of all other PAM Instrumentation of Table 3.3.3.1-1 is based on operating experience and consistency with the refueling cycles.

REFERENCES

1. Regulatory Guide 1.97, "Instrumentation for Light Water Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident," Revision 2, December 1980.

2. NRC letter, T. Ross (NRC) to H.E. Bliss (Commonwealth Edison Company), "Conformance of Post Accident Monitoring Instrumentation at Quad Cities with Regulatory Guide 1.97," dated August 16, 1988.

B 3.3 INSTRUMENTATION

B 3.3.4.1 Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) Instrumentation

BASES

BACKGROUND

The ATWS-RPT System initiates an RPT, adding negative reactivity, following events in which a scram does not but should occur, to lessen the effects of an ATWS event. Tripping the recirculation pumps adds negative reactivity from the increase in steam voiding in the core area as core flow decreases. When Reactor Vessel Water Level — Low Low or Reactor Vessel Steam Dome Pressure — High setpoint is reached, the recirculation motor generator (MG) drive motor field breakers trip.

The ATWS-RPT System (Ref. 1) includes sensors, relays, bypass capability circuit breakers, and switches that are necessary to cause initiation of an RPT. 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 an ATWS-RPT signal to the trip logic.

The ATWS-RPT consists of two independent trip systems, with two channels of Reactor Vessel Steam Dome Pressure — High and two channels of Reactor Vessel Water Level — Low Low in each trip system. Each ATWS-RPT trip system is a two-out-of-two logic for each Function. Thus, either two Reactor Water Level — Low Low or two Reactor Pressure — High signals are needed to trip a trip system. The outputs of the channels in a trip system are combined in a logic so that either trip system will trip both recirculation pumps (by tripping the respective MG drive motor field breakers). Each Reactor Vessel Water Level - Low Low channel output must remain below the setpoint for approximately 9 seconds for the channel output to provide an actuation signal to the associated trip system.

There is one MG drive motor field breaker provided for each of the two recirculation pumps for a total of two breakers. The output of each trip system is provided to both recirculation pump MG drive motor field breakers.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The ATWS-RPT is not assumed to mitigate any accident or transient in the safety analysis. The ATWS-RPT initiates an RPT to aid in preserving the integrity of the fuel cladding following events in which a scram does not, but should, occur. Based on its contribution to the reduction of overall plant risk, however, the instrumentation meets Criterion 4 of 10 CFR 50.36(c)(2)(ii).

The OPERABILITY of the ATWS-RPT is dependent on the OPERABILITY of the individual instrumentation channel Functions. Each Function must have a required number of OPERABLE channels in each trip system, with their setpoints within the specified Allowable Value of SR 3.3.4.1.4. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. Channel OPERABILITY also includes the associated recirculation pump drive motor breakers.

Allowable Values are specified for each ATWS-RPT 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. 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 (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 ATWS analysis (Ref. 2). The trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

because instrument 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 and appropriately applied for the instrumentation.

The individual Functions are required to be OPERABLE in MODE 1 to protect against common mode failures of the Reactor Protection System by providing a diverse trip to mitigate the consequences of a postulated ATWS event. The Reactor Vessel Steam Dome Pressure — High and Reactor Vessel Water Level — Low Low Functions are required to be OPERABLE in MODE 1, since the reactor is producing significant power and the recirculation system could be at high flow. During this MODE, the potential exists for pressure increases or low water level, assuming an ATWS event. In MODE 2, the reactor is at low power and the recirculation system is at low flow; thus, the potential is low for a pressure increase or low water level, assuming an ATWS event. Therefore, the ATWS-RPT is not necessary. In MODES 3 and 4, the reactor is shut down with all control rods inserted; thus, an ATWS event is not significant and the possibility of a significant pressure increase or low water level is negligible. In MODE 5, the one rod out interlock ensures that the reactor remains subcritical; thus, an ATWS event is not significant. In addition, the reactor pressure vessel (RPV) head is not fully tensioned and no pressure transient threat to the reactor coolant pressure boundary (RCPB) exists.

The specific Applicable Safety Analyses and LCO discussions are listed below on a Function by Function basis.

a. <u>Reactor Vessel Water Level — Low Low</u>

Low RPV water level indicates the capability to cool the fuel may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, the ATWS-RPT System is initiated at low low RPV water level to aid in maintaining level above the top of the active fuel. The reduction of core flow reduces the neutron flux and THERMAL POWER and, therefore, the rate of coolant boiloff.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

a. Reactor Vessel Water Level − Low Low (continued)

Reactor vessel water level signals are initiated from four differential pressure 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, with two channels in each trip system, are available and required to be OPERABLE to ensure that no single instrument failure can preclude an ATWS-RPT from this Function on a valid signal. Each channel includes a time delay relay which delays the Reactor Vessel Water Level − Low Low Function channel output signal from providing input to the associated trip system. The Reactor Vessel Water Level − Low Low Allowable Value is chosen so that the system will not be initiated after a reactor vessel water level scram with feedwater still available, and for convenience with the reactor core isolation cooling and high pressure coolant injection initiation. The Reactor Vessel Water Level − Low Low Function trip is delayed since there is an insignificant affect on the ATWS consequences and it is desirable to avoid making the consequences of a loss of coolant accident more severe.

b. Reactor Vessel Steam Dome Pressure − High

Excessively high RPV pressure may rupture the RCPB. An increase in the RPV pressure during reactor operation compresses the steam voids and results in a positive reactivity insertion. This increases neutron flux and THERMAL POWER, which could potentially result in fuel failure and overpressurization. The Reactor Vessel Steam Dome Pressure − High Function initiates an RPT for transients that result in a pressure increase, counteracting the pressure increase by rapidly reducing core power generation. For the overpressurization event, the RPT aids in the termination of the ATWS event and, along with the

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

b. Reactor Vessel Steam Dome Pressure — High (continued)

safety valves, limits the peak RPV pressure to less than the ASME Section III Code Service Level C limits (1500 psig).

The Reactor Vessel Steam Dome Pressure — High signals are initiated from four pressure transmitters that monitor reactor vessel steam dome pressure. Four channels of Reactor Vessel Steam Dome Pressure — High, with two channels in each trip system, are available and are required to be OPERABLE to ensure that no single instrument failure can preclude an ATWS-RPT from this Function on a valid signal. The Reactor Vessel Steam Dome Pressure — High Allowable Value is chosen to provide an adequate margin to the ASME Section III Code Service Level C allowable Reactor Coolant System pressure.

ACTIONS

A Note has been provided to modify the ACTIONS related to ATWS-RPT 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 ATWS-RPT 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 ATWS-RPT instrumentation channel.

A.1 and A.2

With one or more channels inoperable, but with ATWS-RPT trip capability for each Function maintained (refer to Required Actions B.1 and C.1 Bases), the ATWS-RPT System is capable of performing the intended function. However, the

(continued)

ACTIONS

A.1 and A.2 (continued)

reliability and redundancy of the ATWS-RPT instrumentation is reduced, such that a single failure in the remaining trip system could result in the inability of the ATWS-RPT System to perform the intended function. Therefore, only a limited time is allowed to restore the inoperable channels to OPERABLE status. Because of the diversity of sensors available to provide trip signals, the low probability of extensive numbers of inoperabilities affecting all diverse Functions, and the low probability of an event requiring the initiation of ATWS-RPT, 14 days is provided to restore the inoperable channel (Required Action A.1). Alternately, the inoperable channel may be placed in trip (Required Action A.2), since this would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. As noted, placing the channel in trip with no further restrictions is not allowed if the inoperable channel is the result of an inoperable breaker, since this may not adequately compensate for the inoperable breaker (e.g., the breaker may be inoperable such that it will not open). 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 RPT), or if the inoperable channel is the result of an inoperable breaker, Condition D 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 the Function not maintaining ATWS-RPT trip capability. A Function is considered to be maintaining ATWS-RPT trip capability when sufficient channels are OPERABLE or in trip such that the ATWS-RPT System will generate a trip signal from the given Function on a valid signal, and both recirculation pumps can be tripped. This requires two channels of the Function in the same trip system to each be OPERABLE or in trip, and the recirculation pump drive motor breakers to be OPERABLE or in trip.

(continued)

ACTIONS

B.1 (continued)

The 72 hour Completion Time is sufficient for the operator to take corrective action (e.g., restoration or tripping of channels) and takes into account the likelihood of an event requiring actuation of the ATWS-RPT instrumentation during this period and that one Function is still maintaining ATWS-RPT trip capability.

C.1

Required Action C.1 is intended to ensure that appropriate Actions are taken if multiple, inoperable, untripped channels within both Functions result in both Functions not maintaining ATWS-RPT trip capability. The description of a Function maintaining ATWS-RPT trip capability is discussed in the Bases for Required Action B.1 above.

The 1 hour Completion Time is sufficient for the operator to take corrective action and takes into account the likelihood of an event requiring actuation of the ATWS-RPT instrumentation during this period.

D.1 and D.2

With any Required Action and associated Completion Time 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 2 within 6 hours (Required Action D.2). Alternately, the associated recirculation pump may be removed from service since this performs the intended function of the instrumentation (Required Action D.1). The allowed Completion Time of 6 hours is reasonable, based on operating experience, both to reach MODE 2 from full power conditions and to remove a recirculation pump from service 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

(continued)

SURVEILLANCE REQUIREMENTS (continued)

associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains ATWS-RPT 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. 3) 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 recirculation pumps will trip when necessary.

SR 3.3.4.1.1

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 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.

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 upon 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 required channels of this LCO.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.4.1.2

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 SR 3.3.4.1.4. If the trip setting is discovered to be less conservative than the setting accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel performance is still within the requirements of the ATWS 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 31 days is based on engineering judgement and the reliability of these components.

SR 3.3.4.1.3

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. 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 Reference 3.

SR 3.3.4.1.4

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor, including the time delay relays associated with the Reactor Vessel Water Level — Low Low Function. 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 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.4.1.5

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 7.8.
2. UFSAR, Section 15.8
3. GENE-770-06-1-A, "Bases for Changes To Surveillance Test Intervals and Allowed Out-of-Service Times For Selected Instrumentation Technical Specifications," December 1992.

B 3.3 INSTRUMENTATION

B 3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

BASES

BACKGROUND

The purpose of the ECCS instrumentation is to initiate appropriate responses from the systems to ensure that the fuel is adequately cooled in the event of a design basis accident or transient.

For most anticipated operational occurrences and Design Basis Accidents (DBAs), a wide range of dependent and independent parameters are monitored.

The ECCS instrumentation actuates core spray (CS), low pressure coolant injection (LPCI), high pressure coolant injection (HPCI), Automatic Depressurization System (ADS), and the diesel generators (DGs). The equipment involved with each of these systems is described in the Bases for LCO 3.5.1, "ECCS – Operating" and LCO 3.8.1, "AC Sources – Operating."

Core Spray System

The CS System may be initiated by either automatic or manual means, although manual initiation requires manipulation of individual pump and valve control switches. Automatic initiation occurs for conditions of Reactor Vessel Water Level – Low Low (coincident with Reactor Steam Dome Pressure – Low (Permissive)) or Drywell Pressure – High. The Reactor Vessel Water Level – Low Low variable is monitored by four redundant differential pressure switches and the Drywell Pressure – High variable is monitored by four redundant pressure switches. The output of each switch is connected to relays whose contacts input into two trip systems. Each trip system is arranged in a one-out-of-two taken twice logic for each Function. The Reactor Steam Dome Pressure – Low (Permissive) variable is monitored by two redundant pressure switches. The output of each switch is connected to relays whose contacts input into two trip systems. Each trip system is arranged in a one-out-of-two logic. Each trip system will delay CS pump start logic on low low reactor vessel water level until reactor steam dome

(continued)

BACKGROUND

Core Spray System (continued)

pressure has fallen to a value below the CS System's maximum design pressure. The CS pumps start logic will receive the high drywell pressure signals without delay, however, the opening of the injection valves will be delayed for both Functions. Each trip system will start one CS pump and provide signals to the associated CS subsystem valves. Each CS subsystem also receives an ADS initiation signal. Upon receipt of an initiation signal, the CS pumps are started immediately if offsite power is available, otherwise the CS pumps start in approximately 10 seconds after AC power is available from the DG.

The CS test line isolation valve, which is also a primary containment isolation valve (PCIV), is closed on a CS initiation signal to allow full system flow assumed in the accident analyses and maintain primary containment isolated in the event CS is not operating.

The CS pump discharge flow is monitored by a flow transmitter. When the pump is running and discharge flow is low enough so that pump overheating may occur, the minimum flow return line valve is opened. The valve is automatically closed if flow is above the minimum flow setpoint to allow the full system flow assumed in the accident analysis.

Low Pressure Coolant Injection System

The LPCI is an operating mode of the Residual Heat Removal (RHR) System, with two LPCI subsystems. The LPCI subsystems may be initiated by automatic or manual means, although manual initiation requires manipulation of individual pump and valve control switches. Automatic initiation occurs for conditions of Reactor Vessel Water Level — Low Low (coincident with Reactor Steam Dome Pressure — Low (Permissive) or Drywell Pressure — High. The Reactor Vessel Water Level — Low Low variable is monitored by four redundant differential pressure switches and the Drywell Pressure — High variable is monitored by four redundant pressure switches. The output of each switch is connected to relays whose contacts input into two trip systems. Each

(continued)

BACKGROUND

Low Pressure Coolant Injection System (continued)

trip system is arranged in a one-out-of-two taken twice logic for each Function. The Reactor Steam Dome Pressure — Low (Permissive) variable is monitored by two redundant pressure switches. The output of each switch is connected to relays whose contacts input into two trip systems. Each trip system is arranged in a one-out-of-two logic. Each trip system will delay LPCI pump start logic on low low reactor vessel water level until reactor steam dome pressure has fallen to a value below the LPCI System's maximum design pressure. The LPCI pumps start logic will receive the high drywell pressure signals without delay, however, the opening of the injection valves will be delayed for both Functions. Each trip system will start the associated LPCI pumps and provide signals to the associated LPCI valves. Each LPCI subsystem also receives an ADS initiation signal.

Upon receipt of an initiation signal, the LPCI A and C pumps start immediately if offsite power is available, otherwise the pumps start immediately if AC power is available from the associated DG. The LPCI B and D pumps start immediately if offsite power is available, otherwise the pumps are started after approximately a 5 second delay after AC power from the associated DG is available. This time delay limits the loading of the standby power sources.

Each LPCI subsystem's discharge flow is monitored by a flow transmitter. When a pump is running and discharge flow is low enough so that pump overheating may occur, the respective minimum flow return line valve is opened.

The RHR test line suppression pool cooling isolation valve, suppression pool spray isolation valves, and containment spray isolation valves (which are also PCIVs) are also closed on a LPCI initiation signal to allow the full system flow assumed in the accident analyses and maintain primary containment isolated in the event LPCI is not operating.

The LPCI System initiation logic also contains LPCI Loop Select Logic whose purpose is to identify and direct LPCI flow to the unbroken recirculation loop if a Design Basis Accident (DBA) occurs. The LPCI Loop Select Logic is

(continued)

BACKGROUND

Low Pressure Coolant Injection System (continued)

initiated upon the receipt of either a LPCI Reactor Vessel Water Level - Low Low signal or a LPCI Drywell Pressure—High signal, as discussed previously. When initiated, the LPCI Loop Select Logic first determines recirculation pump operation by sensing the differential pressure (dp) between the suction and discharge of each pump. There are four dp switches monitoring each recirculation loop which are, in turn, connected to relays whose contacts are connected to two trip systems. The dp switches will trip when the dp across the pump is approximately 8 psid. The contacts are arranged in a one-out-of-two taken twice logic for each recirculation pump. If the logic senses that either pump is not running, i.e., single loop operation, then a trip signal is sent to both recirculation pumps to eliminate the possibility of pipe breaks being masked by the operating recirculation pump pressure. However, the pump trip signal is delayed approximately 0.5 seconds to ensure that at least one pump is off since the break detection sensitivity is greater with both pumps running. If a pump trip signal is generated, reactor steam dome pressure must drop to a specified value before the logic will continue. This adjusts the selection time to optimize sensitivity and still ensure that LPCI injection is not unnecessarily delayed. The reactor steam dome pressure is sensed by four pressure switches which in turn are connected to relays whose contacts are connected to two trip systems. The contacts are arranged in a one-out-of-two taken twice logic. After the satisfaction of this pressure requirement or if both recirculation pumps indicate they are running, a 2 second time delay is provided to allow momentum effects to establish the maximum differential pressure for loop selection. Selection of the unbroken recirculation loop is then initiated. This is done by comparing the absolute pressure of the two recirculation riser loops. The broken loop is indicated by a lower pressure than the unbroken loop. The loop with the higher pressure is then used for LPCI injection. If, after a small time delay (approximately 0.5 seconds), the pressure in loop A is not indicating higher than loop B, the logic will provide a signal to close the B recirculation loop discharge valve, open the LPCI injection valve to the B recirculation loop and close the LPCI injection valve to the A

(continued)

BACKGROUND

Low Pressure Coolant Injection System (continued)

recirculation loop. This is the "default" choice in the LPCI Loop Select Logic. If recirculation loop A pressure indicates higher than loop B pressure (> 1 psig), the recirculation discharge valve in loop A is closed, the LPCI injection valve to loop A is signaled to open and the LPCI injection valve to loop B is signaled to close. The four dp switches which provide input to this portion of the logic detect the pressure difference between the corresponding risers to the jet pumps in each recirculation loop. The four dp switches are connected to relays whose contacts are connected to two trip systems. The contacts in each trip system are arranged in a one-out-of-two taken twice logic. There are two redundant trip systems in the LPCI Loop Select Logic. The complete logic in each trip system must actuate for operation of the LPCI Loop Select Logic.

High Pressure Coolant Injection System

The HPCI System may be initiated by either automatic or manual means. Automatic initiation occurs for conditions of Reactor Vessel Water Level – Low Low or Drywell Pressure – High. The Reactor Vessel Water Level – Low Low variable is monitored by four redundant differential pressure switches and the Drywell Pressure – High variable is monitored by four redundant pressure switches. The output of each switch is connected to relays whose contacts are arranged in a one-out-of-two taken twice logic for each Function. The logic can also be initiated by use of a Manual Initiation push button.

The HPCI pump discharge flow is monitored by a differential pressure switch. When the pump is running and discharge flow is low enough so that pump overheating may occur, the minimum flow return line valve is opened. The valve is automatically closed if flow is above the minimum flow setpoint to allow the full system flow assumed in the accident analysis.

The HPCI full flow test line isolation valves are closed upon receipt of a HPCI initiation signal to allow the full system flow assumed in the accident analysis.

(continued)

BASES

BACKGROUND

High Pressure Coolant Injection System (continued)

The HPCI System also monitors the water levels in the two contaminated condensate storage tanks (CCSTs) and the unit suppression pool because these are the two sources of water for HPCI operation. Reactor grade water in the CCSTs is the normal source. The HPCI System is normally aligned to both CCSTs. Upon receipt of a HPCI initiation signal, the CCST suction valve is automatically signaled to open (it is normally in the open position) unless both pump suction valves from the suppression pool are open. If the water level in any CCST falls below a preselected level, first the suppression pool suction valves automatically open, and then when the valves are fully open the CCST suction valve automatically closes. Two level switches are used to detect low water level in each CCST. The outputs for these switches are provided to logics of HPCI in both Unit 1 and Unit 2. Any switch can cause the suppression pool suction valves to open and the CCST suction valve to close. The suppression pool suction valves also automatically open and the CCST suction valve closes if high water level is detected in the suppression pool (one-out-of-two logic). To prevent losing suction to the pump, the suction valves are interlocked so that one suction path must be open before the other automatically closes.

The HPCI provides makeup water to the reactor until the reactor vessel water level reaches the Reactor Vessel Water Level—High trip, at which time the HPCI turbine trips, which causes the turbine's stop valve and the pump discharge valve to close. The logic is two-out-of-two to provide high reliability of the HPCI System. The HPCI System automatically restarts if a Reactor Vessel Water Level—Low Low signal is subsequently received.

Automatic Depressurization System

The ADS may be initiated by either automatic or manual means, although manual initiation requires manipulation of each individual relief valve control switch. Automatic initiation occurs when signals indicating Reactor Vessel Water Level—Low Low, Drywell Pressure—High, CS or LPCI Pump Discharge Pressure—High are all present and the ADS

(continued)

BACKGROUND

Automatic Depressurization System (continued)

Initiation Timer has timed out. ADS automatic initiation also occurs when signals indicating Reactor Vessel Water Level – Low Low are present and the ADS Low Low Water Level Actuation Timer times out. However, this initiation occurs since this logic provides a direct initiation of the associated low pressure ECCS pumps, thereby bypassing the CS or LPCI Reactor Steam Dome Pressure (Permissive) channels. After the pumps start the ADS Drywell Pressure – High contacts are effectively bypassed and the above logic is completed after CS or LPCI Pump Discharge Pressure – High channels are actuated and the ADS Initiation Timer has also timed out. There are two differential pressure switches for Reactor Vessel Water Level – Low Low and two pressure switches for Drywell Pressure – High, in each of the two ADS trip systems. Each of these switches connects to a relay whose contacts form the initiation logic.

Each ADS trip system includes time delays between satisfying the initiation logic and the actuation of the ADS valves. The ADS Initiation Timer time delay setpoint and the Low Low Water Level Actuation Time Delay Setpoint are chosen to be long enough that the HPCI has sufficient operating time to recover to a level above Low Low, yet not so long that the LPCI and CS Systems are unable to adequately cool the fuel if the HPCI fails to maintain that level. An alarm in the control room is annunciated when either of the timers is timing. Resetting the ADS initiation signals resets the ADS Initiation Timers.

The ADS also monitors the discharge pressures of the four LPCI pumps and the two CS pumps. Each ADS trip system includes two discharge pressure permissive switches from all CS and LPCI pumps. However, only the switches in the associated division are required to be OPERABLE for each trip system (i.e., Division 1 LPCI pumps A and B input to ADS trip system A, and Division 2 LPCI pumps C and D input to ADS trip system B). The signals are used as a permissive for ADS actuation, indicating that there is a source of core coolant available once the ADS has depressurized the vessel. Any one of the six low pressure pumps is sufficient to permit automatic depressurization.

(continued)

BACKGROUND

Automatic Depressurization System (continued)

The ADS logic (low low reactor vessel and high drywell pressure) in each trip system is arranged in two strings. Each string has a contact from a Reactor Vessel Water Level - Low Low and Drywell Pressure - High Function channel. In addition, each string receives a contact input of a pressure switch associated with each CS and LPCI pump via the use of auxiliary relays and one string includes the ADS initiation timer. All contacts in both logic strings must close, the ADS initiation timer must time out, and a CS or LPCI pump discharge pressure signal must be present to initiate an ADS trip system. Either the A or B trip system will cause all the ADS relief valves to open. Once the Drywell Pressure-High or the ADS initiation signal is present, it is sealed in until manually reset. Both trip strings associated with each ADS logic will also trip if both Reactor Vessel Water Level - Low Low Function channel contacts close, the ADS Low Low Water Level Actuation Timer times out, and a CS or LPCI pump discharge pressure signal is present in each string. This is accomplished since with both Reactor Vessel Water Level - Low Low Function channels tripped and with the ADS Low Low Water Level Actuation Timer timed out the associated low pressure ECCS pumps will receive an initiation signal from this logic, thus bypassing the associated ADS Drywell Pressure - High and CS or LPCI Reactor Steam Dome Pressure (Permissive) Function channels, to start the low pressure ECCS pumps.

Manual inhibit switches are provided in the control room and auxiliary electric equipment room for the ADS; however, their function is not required for ADS OPERABILITY (provided ADS is not inhibited when required to be OPERABLE).

Diesel Generators

The DGs may be initiated by either automatic or manual means. Automatic initiation occurs for conditions of Reactor Vessel Water Level - Low Low or Drywell Pressure - High. The DGs are also initiated upon loss of voltage signals. (Refer to the Bases for LCO 3.3.8.1, "Loss

(continued)

BACKGROUND

Diesel Generators (continued)

of Power (LOP) Instrumentation," for a discussion of these signals.) The Reactor Water Level – Low Low variable is monitored by four redundant differential pressure switches and the Drywell Pressure – High variable is is monitored by four redundant pressure switches. The output of each switch is connected to relays whose contacts are connected to two trip systems. Each trip system is arranged in a one-out-of-two taken twice logic. One trip system starts the unit DG and the other trip system starts the common DG (DG 1/2). The DGs receive their initiation signals from the CS System initiation logic. The DGs can also be started manually from the control room and locally from the associated DG room. Upon receipt of a loss of coolant accident (LOCA) initiation signal, each DG is automatically started, is ready to load in approximately 10 seconds, and will run in standby conditions (rated voltage and speed, with the DG output breaker open). The DGs will only energize their respective Essential Service System (ESS) buses if a loss of offsite power occurs (Refer to Bases for LCO 3.3.8.1).

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The actions of the ECCS are explicitly assumed in the safety analyses of References 1, 2, and 3. The ECCS is initiated to preserve the integrity of the fuel cladding by limiting the post LOCA peak cladding temperature to less than the 10 CFR 50.46 limits.

ECCS instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). Certain instrumentation Functions are retained for other reasons and are described below in the individual Functions discussion.

The OPERABILITY of the ECCS instrumentation is dependent upon the OPERABILITY of the individual instrumentation channel Functions specified in Table 3.3.5.1-1. Each Function must have a required number of OPERABLE channels, with their setpoints within the specified Allowable Values, where appropriate. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. Table 3.3.5.1-1, footnote (b), is added to show that certain ECCS instrumentation Functions are also required to be OPERABLE to perform DG initiation.

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Allowable Values are specified for each ECCS 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. 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 (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 trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

Some Functions (i.e, Functions 1.c, 1.d, 2.c, 4.d, 4.e, 5.d, and 5.e) have both an upper and lower analytic limit that must be evaluated. The Allowable Values and trip setpoints are derived from both an upper and lower analytic limit using the methodology describe above. Due to the upper and lower analytic limits, Allowable Values of these Functions appear to incorporate a range. However, the upper and lower Allowable Values are unique, with each Allowable Value associated with one unique analytic limit and trip setpoint.

In general, the individual Functions are required to be OPERABLE in the MODES or other specified conditions that may

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

require ECCS (or DG) initiation to mitigate the consequences of a design basis transient or accident. To ensure reliable ECCS and DG function, a combination of Functions is required to provide primary and secondary initiation signals.

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

Core Spray and Low Pressure Coolant Injection Systems

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

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. The low pressure ECCS and associated DGs are initiated at Low Low to ensure that core spray and flooding functions are available to prevent or minimize fuel damage. The Reactor Vessel Water Level — Low Low is one of the Functions assumed to be OPERABLE and capable of initiating the ECCS during the transients analyzed in References 1 and 3. In addition, the Reactor Vessel Water Level — Low Low Function is directly assumed in the analysis of the recirculation line break (Ref. 2). The core cooling function of the ECCS, along with the scram action of the Reactor Protection System (RPS), ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Reactor Vessel Water Level — Low Low signals are initiated from four differential pressure switches 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.

The Reactor Vessel Water Level — Low Low Allowable Value is chosen to allow time for the low pressure core flooding systems to activate and provide adequate cooling.

Four channels of CS Reactor Vessel Water Level — Low Low Function are only required to be OPERABLE when the CS or DG(s) are required to be OPERABLE to ensure that no single instrument failure can preclude ECCS and DG initiation. Also, four channels of the LPCI Reactor Vessel Water

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.a 2.a. Reactor Vessel Water Level – Low Low (continued)

Level – Low Low Function are only required to be OPERABLE when the LPCI System is required to be OPERABLE to ensure no single instrument failure can preclude LPCI initiation. Refer to LCO 3.5.1 and LCO 3.5.2, "ECCS – Shutdown," for Applicability Bases for the low pressure ECCS subsystems; LCO 3.8.1, "AC Sources – Operating"; and LCO 3.8.2, "AC Sources – Shutdown," for Applicability Bases for the DGs.

1.b, 2.b. Drywell Pressure – High

High pressure in the drywell could indicate a break in the reactor coolant pressure boundary (RCPB). The low pressure ECCS and associated DGs are initiated upon receipt of the Drywell Pressure – High Function in order to minimize the possibility of fuel damage. The Drywell Pressure – High Function, along with the Reactor Water Level – Low Low Function, is directly assumed in the analysis of the recirculation line break (Ref. 2). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

High drywell pressure signals are initiated from four pressure switches that sense drywell pressure. The Allowable Value was selected to be as low as possible and be indicative of a LOCA inside primary containment.

The Drywell Pressure – High Function is required to be OPERABLE when the ECCS or DG is required to be OPERABLE in conjunction with times when the primary containment is required to be OPERABLE. Thus, four channels of the CS Drywell Pressure – High Function are required to be OPERABLE in MODES 1, 2, and 3 to ensure that no single instrument failure can preclude CS and DG initiation. Also, four channels of the LPCI Drywell Pressure – High Function are required to be OPERABLE in MODES 1, 2, and 3 to ensure no single instrument failure can preclude LPCI initiation. In MODES 4 and 5, the Drywell Pressure – High Function is not required, since there is insufficient energy in the reactor to pressurize the primary containment to Drywell Pressure – High setpoint. Refer to LCO 3.5.1 for Applicability Bases for the low pressure ECCS subsystems and to LCO 3.8.1 for Applicability Bases for the DGs.

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

1.c, 2.c. Reactor Steam Dome Pressure — Low (Permissive)

Low reactor steam dome pressure signals are used as permissives for the low pressure ECCS subsystems. This ensures that, prior to opening the injection valves of the low pressure ECCS subsystems, the reactor pressure has fallen to a value below these subsystems' maximum design pressure. The channels also delay CS and LPCI pump starts on Reactor Vessel Water Level — Low Low until reactor steam dome pressure is below the setpoint. The Reactor Steam Dome Pressure — Low (Permissive) is one of the Functions assumed to be OPERABLE and capable of permitting initiation of the ECCS during the transients analyzed in References 1 and 3. In addition, the Reactor Steam Dome Pressure — Low Function is directly assumed in the analysis of the recirculation line break (Ref. 2). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

The Reactor Steam Dome Pressure — Low (Permissive) signals are initiated from two pressure switches that sense the reactor steam dome pressure.

The Allowable Value is low enough to prevent overpressuring the equipment in the low pressure ECCS, but high enough to ensure that the ECCS injection prevents the fuel peak cladding temperature from exceeding the limits of 10 CFR 50.46.

Two channels of Reactor Steam Dome Pressure — Low Function are only required to be OPERABLE when the ECCS is required to be OPERABLE to ensure that no single instrument failure can preclude ECCS initiation. Refer to LCO 3.5.1 and LCO 3.5.2 for Applicability Bases for the low pressure ECCS subsystems.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

1.d, 2.f. Core Spray and Low Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)

The minimum flow instruments are provided to protect the associated low pressure ECCS pump from overheating when the pump is operating and the associated injection valve is not sufficiently open. The minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow rate is adequate to protect the pump. The CS Pump Discharge Flow - Low (Bypass) Function is assumed to be OPERABLE and capable of closing the minimum flow valves to ensure that the CS flow assumed during the transients and accidents analyzed in References 1, 2, and 3 is met. The LPCI Pump Discharge Flow - Low (Bypass) Function is only required to be OPERABLE for opening since the LPCI flow valves are assumed to remain open during the transients and accidents analyzed in References 1, 2, and 3. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

One flow transmitter per CS pump and one flow transmitter per LPCI subsystem are used to detect the associated subsystems' flow rates. The logic is arranged such that each transmitter causes its associated minimum flow valve to open when flow is low with the pump running. The logic will close the minimum flow valve once the closure setpoint is exceeded. The LPCI minimum flow valves are time delayed such that the valves will not open for 10 seconds after the switches detect low flow. The time delay is provided to limit reactor vessel inventory loss during the startup of the RHR shutdown cooling mode. The Pump Discharge Flow - Low (Bypass) Allowable Values are high enough to ensure that the pump flow rate is sufficient to protect the pump. The Core Spray Discharge Flow - Low (Bypass) Allowable Value is also low enough to ensure that the closure of the minimum flow valve is initiated to allow full flow into the core. For LPCI, the closure of the minimum flow valves is not credited.

Each channel of Pump Discharge Flow - Low (Bypass) Function (two CS channels and two LPCI channels) is only required to be OPERABLE when the associated ECCS is required to be

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

<u>1.d, 2.f. Core Spray and Low Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)</u> (continued

OPERABLE to ensure that no single instrument failure can preclude the ECCS function. Refer to LCO 3.5.1 and LCO 3.5.2 for Applicability Bases for the low pressure ECCS subsystems.

<u>1.e, 2.e. Core Spray and Low Pressure Coolant Injection Pump Start - Time Delay Relay</u>

The purpose of this time delay is to stagger the start of CS and LPCI pumps that are in each of Divisions 1 and 2, thus limiting the starting transients on the 4160 V ESS buses. This Function is only necessary when power is being supplied from the standby power sources (DG). The CS and LPCI Pump Start - Time Delay Relays are assumed to be OPERABLE in the accident and transient analyses requiring ECCS initiation. That is, the analyses assume that the pumps will initiate when required and excess loading will not cause failure of the power sources.

There are two CS Pump Start - Time Delay relays and two LPCI Pump Start - Time Delay Relays, one for each CS pump and one for LPCI pump B and D. While each time delay relay is dedicated to a single pump start logic, a single failure of a LPCI Pump Start - Time Delay Relay could result in the failure of the three low pressure ECCS pumps, powered from the same ESS bus, to perform their intended function (e.g., as in the case where both ECCS pumps on one ESS bus start simultaneously due to an inoperable time delay relay). This still leaves three of the six low pressure ECCS pumps OPERABLE; thus, the single failure criterion is met (i.e., loss of one instrument does not preclude ECCS initiation). The Allowable Values for the CS and LPCI Pump Start - Time Delay Relays are chosen to be short enough so that ECCS operation is not degraded.

Each CS and LPCI Pump Start - Time Delay Relay Function is required to be OPERABLE only when the associated LPCI subsystem is required to be OPERABLE. Refer to LCO 3.5.1 and LCO 3.5.2 for Applicability Bases for the CS and LPCI subsystems.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2.d, 2.j Reactor Steam Dome Pressure - Low (Break Detection) and Reactor Steam Dome Pressure Time Delay - Relay (Break Detection)

The purpose of the Reactor Steam Dome Pressure - Low (Break Detection) and Reactor Steam Dome Pressure Time Delay - Relay (Break Detection) Functions are to optimize the LPCI Loop Select Logic sensitivity if the logic previously actuated recirculation pump trips. This is accomplished by preventing the logic from continuing on to the unbroken loop selection activity until reactor steam dome pressure has dropped below a specified value. These Functions are only required to be OPERABLE for the DBA LOCA analysis, i.e., if the break location is in the recirculation system suction piping (Ref. 2). For a DBA LOCA, the analysis assumes that the LPCI Loop Select Logic successfully identifies and directs LPCI flow to the unbroken recirculation loop so that core reflooding is accomplished in time to ensure that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46. For other LOCA events, (i.e., non-DBA recirculation system pipe breaks), or other RPV pipe breaks the success of the Loop Select Logic is less critical than for the DBA.

Reactor Steam Dome Pressure - Low (Break Detection) signals are initiated from four pressure switches that sense the reactor steam dome pressure. Reactor Steam Dome Pressure Time Delay - Relay (Break Detection) signals are initiated from two time delay relays.

The Reactor Steam Dome Pressure - Low (Break Detection) Allowable Value is chosen to allow for coastdown of any recirculation pump which has just tripped, this optimizes the sensitivity of the LPCI Loop Select Logic while ensuring that LPCI injection is not delayed. The Reactor Steam Dome Pressure Time Delay - Relay (Break Detection) Allowable Value is chosen to allow momentum effects to establish the maximum differential pressure for break detection.

Four channels of the Reactor Steam Dome Pressure - Low (Break Detection) Function and two channels of the Reactor Steam Dome Pressure Time Delay-Relay (Break Detection) Function are only required to be OPERABLE in MODES 1, 2, and 3 to ensure that no single failure can prevent the LPCI Loop

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.d, 2.j Reactor Steam Dome Pressure – Low (Break Detection) and Reactor Steam Dome Pressure Time Delay – Relay (Break Detection) (continued)

Select Logic from successfully selecting the unbroken recirculation loop for LPCI injection. These Functions are not required to be OPERABLE in MODES 4 and 5 because, in those MODES, the loop for selection is controlled by plant operating procedures which ensure an OPERABLE LPCI flow path.

2.g, 2.i Recirculation Pump Differential Pressure – High (Break Detection) and Recirculation Pump Differential Pressure Time Delay – Relay (Break Detection)

Recirculation Pump Differential Pressure signals are used by the LPCI Loop Select Logic to determine if either recirculation pump is running. If either pump is not running, i.e., Single Loop Operation, the logic, after a short time delay, sends a trip signal to both recirculation pumps. This is necessary to eliminate the possibility of small pipe breaks being masked by a running recirculation pump. These Functions are only required to be OPERABLE for the DBA LOCA analysis, i.e., if the break location is in the recirculation system suction piping (Ref. 2). For a DBA LOCA, the analysis assumes that the LPCI Loop Select Logic successfully identifies and directs LPCI flow to the unbroken recirculation loop so that core reflooding is accomplished in time to ensure that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46. For other LOCA events (i.e., non-DBA recirculation system pipe breaks or other RPV pipe breaks), the success of the Loop Select Logic is less critical than for the DBA.

Recirculation Pump Differential Pressure – High (Break Detection) signals are initiated from eight differential pressure switches, four of which sense the pressure differential between the suction and discharge of each recirculation pump. Recirculation Pump Differential Pressure Time Delay – Relay (Break Detection) signals are initiated by two time delay relays.

The Recirculation Pump Differential Pressure – High (Break Detection) Allowable Value is chosen to be as low as

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.g, 2.i Recirculation Pump Differential Pressure – High (Break Detection) and Recirculation Pump Differential Pressure Time Delay – Relay (Break Detection) (continued)

possible, while still maintaining the ability to differentiate between a running and non-running recirculation pump. Recirculation Pump Differential Pressure Time Delay – Relay (Break Detection) Allowable Value is chosen to allow enough time to determine the status of the operating conditions of the recirculation pumps.

Eight channels of the Recirculation Pump Differential Pressure – High (Break Detection) Function and two channels of the Recirculation Pump Differential Pressure Time Delay – Relay (Break Detection) Function are only required to be OPERABLE in MODES 1, 2, and 3 to ensure that no single failure can prevent the LPCI Loop Select Logic from successfully determining if either recirculation pump is running. This Function is not required to be OPERABLE in MODES 4 and 5 because, in those MODES, the loop for selection is controlled by plant operating procedures which ensure an OPERABLE LPCI flow path.

2.h, 2.k Recirculation Riser Differential Pressure – High (Break Detection) and Recirculation Riser Differential Pressure Time Delay – Relay (Break Detection)

Recirculation Riser Differential Pressure signals are used by the LPCI Loop Select Logic to determine which, if any, recirculation loop is broken. This is accomplished by comparing the pressure of the two recirculation loops. A broken loop will be indicated by a lower pressure than an unbroken loop. The loop with the higher pressure is then selected, after a short delay, for LPCI injection. If neither loop is broken, the logic defaults to injecting into the "B" recirculation loop. These Functions are only required to be OPERABLE for the DBA LOCA analysis, i.e., if the break location is in the recirculation system suction piping (Ref. 2). For a DBA LOCA, the analysis assumes that the LPCI Loop Select Logic successfully identifies and directs LPCI flow to the unbroken recirculation loop, the analysis assumes that the LPCI Loop Select Logic successfully identifies and directs LPCI flow to the

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2.h, 2.k Recirculation Riser Differential Pressure – High (Break Detection) and Recirculation Riser Differential Pressure Time Delay – Relay (Break Detection) (continued)

unbroken recirculation loop so that core reflooding is accomplished in time to ensure that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46. For other LOCA events, (i.e., non-DBA recirculation system pipe breaks), or other RPV pipe breaks, the success of the Loop Select Logic is less critical than for the DBA.

Recirculation Riser Differential Pressure – High (Break Detection) signals are initiated from four differential pressure switches that sense the pressure differential between the A recirculation loop riser and the B recirculation loop riser. If, after a small time delay, the pressure in loop A is not indicating higher than loop B pressure, the logic will select the B loop for injection. If recirculation loop A pressure is indicating higher than loop B pressure, the logic will select the A loop for LPCI injection. Recirculation Riser Differential Pressure Time Delay – Relay (Break Detection) signals are initiated by two time delay relays.

The Recirculation Riser Differential Pressure – High (Break Detection) Allowable Value is chosen to be as low as possible, while still maintaining the ability to differentiate between a broken and unbroken recirculation loop. The Recirculation Riser Differential Pressure Time Delay – Relay (Break Detection) Allowable Value is chosen to provide a sufficient amount of time to determine which loop is broken.

Four channels of the Recirculation Riser Differential Pressure – High (Break Detection) Function and two channels of the Recirculation Riser Differential Pressure Time Delay – Relay (Break Detection) Function are only required to be OPERABLE in MODES 1, 2, and 3 to ensure that no single failure can prevent the LPCI Loop Select Logic from successfully selecting the unbroken recirculation loop for LPCI injection. This Function is not required to be OPERABLE in MODES 4 and 5 because, in those MODES, the loop for selection is controlled by plant operating procedures which ensure an OPERABLE LPCI flow path.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

HPCI System

3.a. Reactor Vessel Water Level - Low Low

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, the HPCI System is initiated at Low Low to maintain level above the top of the active fuel. The Reactor Vessel Water Level - Low Low is one of the Functions assumed to be OPERABLE and capable of initiating HPCI during the transients analyzed in References 1 and 3. Additionally, the Reactor Vessel Water Level - Low Low Function associated with HPCI is directly assumed in the analysis of the recirculation line break (Ref. 2). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Reactor Vessel Water Level - Low Low signals are initiated from four differential pressure switches 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.

The Reactor Vessel Water Level - Low Low Allowable Value is high enough such that for complete loss of feedwater flow, the Reactor Core Isolation Cooling (RCIC) System flow with HPCI assumed to fail will be sufficient to maintain reactor vessel water level above the core.

Four channels of Reactor Vessel Water Level - Low Low Function are required to be OPERABLE only when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI initiation. Refer to LCO 3.5.1 for HPCI Applicability Bases.

3.b. Drywell Pressure - High

High pressure in the drywell could indicate a break in the RCPB. The HPCI System is initiated upon receipt of the Drywell Pressure - High Function in order to minimize the

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.b. Drywell Pressure – High (continued)

possibility of fuel damage. The Drywell Pressure – High Function, along with the Reactor Water Level – Low Low Function, is directly assumed in the small break LOCA analysis (Ref. 2). The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

High drywell pressure signals are initiated from four pressure switches that sense drywell pressure. The Allowable Value was selected to be as low as possible to be indicative of a LOCA inside primary containment.

Four channels of the Drywell Pressure – High Function are required to be OPERABLE when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI initiation. Refer to LCO 3.5.1 for the Applicability Bases for the HPCI System.

3.c. Reactor Vessel Water Level – High

High RPV water level indicates that sufficient cooling water inventory exists in the reactor vessel such that there is no danger to the fuel. Therefore, the Reactor Vessel Water Level – High Function signal is used to trip the HPCI turbine to prevent overflow into the main steam lines (MSLs). The Reactor Vessel Water Level – High Function is not assumed in the plant specific accident and transient analyses. It was retained since it is a potentially significant contributor to risk.

Reactor Vessel Water Level – High signals for HPCI are initiated from two differential pressure switches from the narrow range water level measurement instrumentation. Both signals are required in order to close the HPCI injection valve. This ensures that no single instrument failure can preclude HPCI initiation. The Reactor Vessel Water Level – High Allowable Value is chosen to prevent flow from the HPCI System from overflowing into the MSLs.

Two channels of Reactor Vessel Water Level – High Function are required to be OPERABLE only when HPCI is required to be OPERABLE. Refer to LCO 3.5.1 for HPCI Applicability Bases.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

3.d. Contaminated Condensate Storage Tank Level — Low

Low level in a CCST indicates the unavailability of an adequate supply of makeup water from this normal source. Normally the suction valves between HPCI and the CCSTs are open and, upon receiving a HPCI initiation signal, water for HPCI injection would be taken from the CCSTs. However, if the water levels in the CCSTs fall below a preselected level, first the suppression pool suction valves automatically open, and then the CCST suction valve automatically closes. This ensures that an adequate supply of makeup water is available to the HPCI pump. To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valves must be open before the CCST suction valve automatically closes. The Function is implicitly assumed in the accident and transient analyses (which take credit for HPCI) since the analyses assume that the HPCI suction source is the suppression pool.

Contaminated Condensate Storage Tank Level — Low signals are initiated from four level switches (two associated with each CCST). The output from these switches are provided to the logics of both HPCI Systems. The logic is arranged such that any level switch can cause the suppression pool suction valves to open and the CCST suction valve of both units to close. The Contaminated Condensate Storage Tank Level — Low Function Allowable Value is high enough to ensure adequate pump suction head while water is being taken from either CCST.

Any two channels of the Contaminated Condensate Storage Tank Level — Low Function are required to be OPERABLE only when HPCI is required to be OPERABLE and when both CCSTs are aligned to the HPCI System or two channels associated with the CCST aligned to HPCI when one CCST is isolated from the unit HPCI System. These requirements will ensure that no single instrument failure can preclude HPCI swap to suppression pool source. Refer to LCO 3.5.1 for HPCI Applicability Bases.

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3.e. Suppression Pool Water Level - High

Excessively high suppression pool water could result in the loads on the suppression pool exceeding design values should there be a blowdown of the reactor vessel pressure through the relief valves. Therefore, signals indicating high suppression pool water level are used to transfer the suction source of HPCI from the CCST to the suppression pool to eliminate the possibility of HPCI continuing to provide additional water from a source outside containment. To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valves must be open before the CCST suction valve automatically closes.

This Function is implicitly assumed in the accident and transient analyses (which take credit for HPCI) since the analyses assume that the HPCI suction source is the suppression pool.

Suppression Pool Water Level - High signals are initiated from two level switches. The logic is arranged such that either switch can cause the suppression pool suction valves to open and the CCST suction valve to close. The Allowable Value for the Suppression Pool Water Level - High Function is chosen to ensure that HPCI will be aligned for suction from the suppression pool before the water level reaches the point at which suppression pool design loads would be exceeded. The Allowable Value is confirmed by performance of a CHANNEL FUNCTIONAL TEST. This is acceptable since the design layout of the installation ensures the switches will trip at a level lower than the Allowable Value.

Two channels of Suppression Pool Water Level - High Function are required to be OPERABLE only when HPCI is required to be OPERABLE to ensure that no single instrument failure can preclude HPCI swap to suppression pool source. Refer to LCO 3.5.1 for HPCI Applicability Bases.

3.f. High Pressure Coolant Injection Pump Discharge Flow - Low (Bypass)

The minimum flow instruments are provided to protect the HPCI pump from overheating when the pump is operating and the associated injection valve is not sufficiently open. The minimum flow line valve is opened when low flow is sensed, and the valve is automatically closed when the flow

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.f. High Pressure Coolant Injection Pump Discharge Flow — Low (Bypass) (continued)

rate is adequate to protect the pump. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

One differential pressure switch is used to detect the HPCI System's flow rate. The logic is arranged such that the switch causes the minimum flow valve to open. The logic will close the minimum flow valve once the closure setpoint is exceeded.

The High Pressure Coolant Injection Pump Discharge Flow — Low (Bypass) Allowable Value is high enough to ensure that pump flow rate is sufficient to protect the pump.

One channel is required to be OPERABLE when the HPCI is required to be OPERABLE. Refer to LCO 3.5.1 for HPCI Applicability Bases.

3.g. Manual Initiation

The Manual Initiation push button channel introduces signals into the HPCI logic to provide manual initiation capability and is redundant to the automatic protective instrumentation. There is one push button for the HPCI System.

The Manual Initiation Function is not assumed in any accident or transient analyses in the UFSAR. However, the Function is retained for overall redundancy and diversity of the HPCI function as required by the NRC in the plant licensing basis.

There is no Allowable Value for this Function since the channel is mechanically actuated based solely on the position of the push button. One channel of the Manual Initiation Function is required to be OPERABLE only when the HPCI System is required to be OPERABLE. Refer to LCO 3.5.1 for HPCI Applicability Bases.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Automatic Depressurization System

4.a, 5.a. Reactor Vessel Water Level - Low Low

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, ADS receives one of the signals necessary for initiation from this Function. The Reactor Vessel Water Level - Low Low is one of the Functions assumed to be OPERABLE and capable of initiating the ADS during the accident analyzed in Reference 2. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Reactor Vessel Water Level - Low Low signals are initiated from four differential pressure switches 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 Function are required to be OPERABLE only when ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. Two channels input to ADS trip system A, while the other two channels input to ADS trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

The Reactor Vessel Water Level - Low Low Allowable Value is chosen to allow time for the low pressure core flooding systems to initiate and provide adequate cooling.

4.b, 5.b. Drywell Pressure - High

High pressure in the drywell could indicate a break in the RCPB. Therefore, ADS receives one of the signals necessary for initiation from this Function in order to minimize the possibility of fuel damage. The Drywell Pressure - High is assumed to be OPERABLE and capable of initiating the ADS during the accidents analyzed in Reference 2. The core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

4.b, 5.b. Drywell Pressure — High (continued)

Drywell Pressure — High signals are initiated from four pressure switches that sense drywell pressure. The Allowable Value was selected to be as low as possible and be indicative of a LOCA inside primary containment.

Four channels of Drywell Pressure — High Function are only required to be OPERABLE when ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. Two channels input to ADS trip system A, while the other two channels input to ADS trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

4.c, 5.c. Automatic Depressurization System Initiation Timer

The purpose of the Automatic Depressurization System Initiation Timer is to delay depressurization of the reactor vessel to allow the HPCI System time to maintain reactor vessel water level. Since the rapid depressurization caused by ADS operation is one of the most severe transients on the reactor vessel, its occurrence should be limited. By delaying initiation of the ADS Function, the operator is given the chance to monitor the success or failure of the HPCI System to maintain water level, and then to decide whether or not to allow ADS to initiate, to delay initiation further by recycling the timer, or to inhibit initiation permanently. The Automatic Depressurization System Initiation Timer Function is assumed to be OPERABLE for the accident analyses of Reference 2 that require ECCS initiation and assume failure of the HPCI System.

There are two Automatic Depressurization System Initiation Timer relays, one in each of the two ADS trip systems. The Allowable Value for the Automatic Depressurization System Initiation Timer is chosen so that there is still time after depressurization for the low pressure ECCS subsystems to provide adequate core cooling.

Two channels of the Automatic Depressurization System Initiation Timer Function are only required to be OPERABLE when the ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. One

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

4.c, 5.c. Automatic Depressurization System Initiation Timer (continued)

channel inputs to ADS trip system A, while the other channel inputs to ADS trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

4.d, 4.e, 5.d, 5.e. Core Spray and Low Pressure Coolant Injection Pump Discharge Pressure – High

The Pump Discharge Pressure – High signals from the CS and LPCI pumps (indicating that the associated pump is running) are used as permissives for ADS initiation, indicating that there is a source of low pressure cooling water available once the ADS has depressurized the vessel. Pump Discharge Pressure – High is one of the Functions assumed to be OPERABLE and capable of permitting ADS initiation during the events analyzed in Reference 2 with an assumed HPCI failure. For these events the ADS depressurizes the reactor vessel so that the low pressure ECCS can perform the core cooling functions. This core cooling function of the ECCS, along with the scram action of the RPS, ensures that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46.

Pump discharge pressure signals are initiated from twelve pressure switches, two on the discharge side of each of the six low pressure ECCS pumps. In order to generate an ADS permissive in one trip system, it is necessary that only one pump (both channels for the pump) indicate the high discharge pressure condition. The Pump Discharge Pressure – High Allowable Value is less than the pump discharge pressure when the pump is operating in a full flow mode and high enough to avoid any condition that results in a discharge pressure permissive when the CS and LPCI pumps are aligned for injection and the pumps are not running. The actual operating point of this function is not assumed in any transient or accident analysis.

Twelve channels of Core Spray and Low Pressure Coolant Injection Pump Discharge Pressure – High Function are only required to be OPERABLE when the ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. Two CS channels associated with CS

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

4.d, 4.e, 5.d, 5.e. Core Spray and Low Pressure Coolant Injection Pump Discharge Pressure—High (continued)

pump A and two LPCI channels associated with LPCI pump A and two channels associated with LPCI pump B are required for trip system A. Two CS channels associated with CS pump B and two LPCI channels associated with LPCI pump C and 2 channels associated with LPCI pump D are required for trip system B. Refer to LCO 3.5.1 for ADS Applicability Bases.

4.f, 5.f. Automatic Depressurization System Low Low Water Level Actuation Timer

One of the signals required for ADS initiation is Drywell Pressure—High. However, if the event requiring ADS initiation occurs outside the drywell (e.g., main steam line break outside containment), a high drywell pressure signal may never be present. Therefore, the Automatic Depressurization System Low Low Water Level Actuation Timer is used to bypass the Drywell Pressure—High Function after a certain time period has elapsed. Operation of the Automatic Depressurization System Low Water Level Actuation Timer Function is not assumed in any plant specific accident analyses or transient analyses. The instrumentation is retained in the TS because ADS is part of the primary success path for mitigation of a DBA.

There are two Automatic Depressurization System Low Low Water Level Actuation Timer relays, one in each of the two ADS trip systems. The Allowable Value for the Automatic Depressurization System Low Low Water Level Actuation Timer is chosen to ensure that there is still time after depressurization for the low pressure ECCS subsystems to provide adequate core cooling.

Two channels of the Automatic Depressurization System Low Water Level Actuation Timer Function are only required to be OPERABLE when the ADS is required to be OPERABLE to ensure that no single instrument failure can preclude ADS initiation. Refer to LCO 3.5.1 for ADS Applicability Bases.

ACTIONS

A Note has been provided to modify the ACTIONS related to ECCS instrumentation channels. Section 1.3, Completion

(continued)

ACTIONS (continued)

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 ECCS instrumentation channels provide appropriate compensatory measures for separate inoperable Condition entry for each inoperable ECCS instrumentation channel.

A.1

Required Action A.1 directs entry into the appropriate Condition referenced in Table 3.3.5.1-1. The applicable Condition referenced in the table is Function dependent. Each time a required channel is discovered inoperable, Condition A is entered for that channel and provides for transfer to the appropriate subsequent Condition.

B.1, B.2, and B.3

Required Actions B.1 and B.2 are intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same variable result in redundant automatic initiation capability being lost for the feature(s). Required Action B.1 features would be those that are initiated by Functions 1.a, 1.b, 2.a, 2.b, 2.d and 2.j (i.e., low pressure ECCS and associated DG). The Required Action B.2 system would be HPCI. For Required Action B.1, redundant automatic initiation capability is lost if (a) two or more Function 1.a channels are inoperable and untripped such that both trip systems lose initiation capability, (b) two or more Function 2.a channels are inoperable and untripped such that both trip systems lose initiation capability, (c) two or more Function 1.b channels are inoperable and untripped such that both trip systems lose initiation capability, (d) two or more Function 2.b channels are inoperable and untripped such that both trip systems lose initiation capability. (e) two or more Function 2.d channels are inoperable and untripped such that

(continued)

ACTIONS

B.1, B.2, and B.3 (continued)

both trip systems lose initiation capability, or (f) two Function 2.j channels are inoperable and untripped. For low pressure ECCS, since each inoperable channel would have Required Action B.1 applied separately (refer to ACTIONS Note), each inoperable channel would only require the affected portion of the associated system of low pressure ECCS and DGs to be declared inoperable. However, since channels in both associated low pressure ECCS subsystems (e.g., both CS subsystems) are inoperable and untripped, and the Completion Times started concurrently for the channels in both subsystems, this results in the affected portions in the associated low pressure ECCS and DGs being concurrently declared inoperable. For Required Action B.2, redundant automatic initiation capability (i.e., loss of automatic start capability for Functions 3.a and 3.b) is lost if two Function 3.a or two Function 3.b channels are inoperable and untripped in the same trip system.

In this situation (loss of redundant automatic initiation capability), the 24 hour allowance of Required Action B.3 is not appropriate and the feature(s) associated with the inoperable, untripped channels must be declared inoperable within 1 hour. As noted (Note 1 to Required Action B.1), Required Action B.1 is only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the low pressure ECCS is not assumed and the probability of a LOCA is lower. Thus, a total loss of initiation capability for 24 hours (as allowed by Required Action B.3) is allowed during MODES 4 and 5. There is no similar Note provided for Required Action B.2 since HPCI instrumentation is not required in MODES 4 and 5; thus, a Note is not necessary. Notes are also provided (Note 2 to Required Action B.1 and the Note to Required Action B.2) to delineate which Required Action is applicable for each Function that requires entry into Condition B if an associated channel is inoperable. This ensures that the proper loss of initiation capability check is performed.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action B.1, the Completion Time only begins

(continued)

ACTIONS

B.1, B.2, and B.3 (continued)

upon discovery that a redundant feature in the same system (e.g., both CS subsystems) cannot be automatically initiated due to inoperable, untripped channels within the same Function as described in the paragraph above. For Required Action B.2, the Completion Time only begins upon discovery that the HPCI System cannot be automatically initiated due to two inoperable, untripped channels for the associated variable in the same trip system. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 4) to permit restoration of any 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 tripped condition per Required Action B.3. 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 initiation), Condition H must be entered and its Required Action taken.

C.1 and C.2

Required Action C.1 is intended to ensure that appropriate actions are taken if multiple, inoperable channels within the same variable result in redundant automatic initiation capability being lost for the feature(s). Required Action C.1 features would be those that are initiated by Functions 1.c, 1.e, 2.c, 2.e, 2.g, 2.h, 2.i, and 2.k (i.e., low pressure ECCS). Redundant automatic initiation capability is lost if either (a) two Function 1.c channels are inoperable in both trip systems, (b) two Function 2.c channels are inoperable in both trip systems, (c) two Function 1.e channels are inoperable, (d) two Function 2.e channels are inoperable, (e) two or more Function 2.g

(continued)

ACTIONS

C.1 and C.2 (continued)

channels, associated with a recirculation pump are inoperable such that both trip systems lose initiation capability, (f) two or more Function 2.h channels are inoperable such that both trip systems lose initiation capability, (g) two Function 2.i channels are inoperable, or (h) two Function 2.k channels are inoperable. Since each inoperable channel would have Required Action C.1 applied separately (refer to ACTIONS Note), each inoperable channel would only require the affected portion of the associated system to be declared inoperable. However, since channels for both low pressure ECCS subsystems are inoperable (e.g., both CS subsystems), and the Completion Times started concurrently for the channels in both subsystems, this results in the affected portions in both subsystems being concurrently declared inoperable. For Functions 1.e, and 2.e, the affected portions are the associated low pressure ECCS pumps. For Functions 1.c and 2.c, the affected portions are the associated ECCS pumps and valves. For Functions 2.g, 2.h, 2.i, and 2.k, the affected portions are the associated LPCI valves.

In this situation (loss of redundant automatic initiation capability), the 24 hour allowance of Required Action C.2 is not appropriate and the feature(s) associated with the inoperable channels must be declared inoperable within 1 hour. As noted (Note 1), Required Action C.1 is only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the ECCS is not assumed and the probability of a LOCA is lower. Thus, a total loss of automatic initiation capability for 24 hours (as allowed by Required Action C.2) is allowed during MODES 4 and 5.

Note 2 states that Required Action C.1 is only applicable for Functions 1.c, 1.e, 2.c, 2.e, 2.g, 2.h, 2.i, and 2.k. Required Action C.1 is not applicable to Function 3.g (which also requires entry into this Condition if a channel in this Function is inoperable), since it is the HPCI Manual Initiation Function which is not assumed in any accident or transient analysis. Thus, a total loss of HPCI Manual Initiation capability for 24 hours (as allowed by Required Action C.2) is allowed. Required Action C.1 is also not applicable to Function 3.c (which also requires entry into

(continued)

ACTIONS

C.1 and C.2 (continued)

this Condition if a channel in this Function is inoperable), since the loss of the Function was considered during the development of Reference 4 and considered acceptable for the 24 hours allowed by Required Action C.2.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action C.1, the Completion Time only begins upon discovery that the same feature in both subsystems (e.g., both CS subsystems) cannot be automatically initiated due to inoperable channels within the same variable as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 4) to permit restoration of any inoperable channel to OPERABLE status. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, Condition H must be entered and its Required Action taken. The Required Actions do not allow placing the channel in trip since this action would either cause the initiation or it would not necessarily result in a safe state for the channel in all events.

D.1, D.2.1, and D.2.2

Required Action D.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in a complete loss of automatic component initiation capability for the HPCI System. If both CCSTs are available, HPCI automatic initiation capability is lost if four Function 3.d channels (2 of the required channels) are inoperable and untripped. If one CCST is not available, automatic initiation capability is lost if two channels associated with the aligned CCST are inoperable and untripped. HPCI automatic

(continued)

ACTIONS

D.1, D.2.1, and D.2.2 (continued)

initiation capability is lost if two Function 3.e channels are inoperable and untripped. In this situation (loss of automatic suction swap), the 24 hour allowance of Required Actions D.2.1 and D.2.2 is not appropriate and the HPCI System must be declared inoperable within 1 hour after discovery of loss of HPCI initiation capability. As noted, Required Action D.1 is only applicable if the HPCI pump suction is not aligned to the suppression pool, since, if aligned, the Function is already performed.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action D.1, the Completion Time only begins upon discovery that the HPCI System cannot be automatically aligned to the suppression pool due to two inoperable, untripped channels in the same Function. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 4) to permit restoration of any 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 tripped condition per Required Action D.2.1 or the suction source must be aligned to the suppression pool per Required Action D.2.2. Placing the inoperable channel in trip performs the intended function of the channel (shifting the suction source to the suppression pool). Performance of either of these two Required Actions will allow operation to continue. If Required Action D.2.1 or D.2.2 is performed, measures should be taken to ensure that the HPCI System piping remains filled with water. Alternately, if it is not desired to perform Required Actions D.2.1 and D.2.2 (e.g., as in the case where shifting the suction source could drain down the HPCI suction piping), Condition H must be entered and its Required Action taken.

(continued)

ACTIONS (continued)

E.1 and E.2

Required Action E.1 is intended to ensure that appropriate actions are taken if multiple, inoperable channels within the Core Spray and Low Pressure Coolant Injection Pump Discharge Flow – Low (Bypass) Functions result in redundant automatic initiation capability being lost for the feature(s). For Required Action E.1, the features would be those that are initiated by Functions 1.d and 2.f (i.e., low pressure ECCS). Redundant automatic initiation capability is lost if (a) two Function 1.d channels are inoperable or (b) two Function 2.f channels are inoperable. Since each inoperable channel would have Required Action E.1 applied separately (refer to ACTIONS Note), each inoperable channel would only require the affected low pressure ECCS pump to be declared inoperable. However, since channels for more than one low pressure ECCS pump are inoperable, and the Completion Times started concurrently for the channels of the low pressure ECCS pumps, this results in the affected low pressure ECCS pumps being concurrently declared inoperable.

In this situation (loss of redundant automatic initiation capability), the 7 day allowance of Required Action E.2 is not appropriate and the subsystem associated with each inoperable channel must be declared inoperable within 1 hour. As noted (Note 1 to Required Action E.1), Required Action E.1 is only applicable in MODES 1, 2, and 3. In MODES 4 and 5, the specific initiation time of the ECCS is not assumed and the probability of a LOCA is lower. Thus, a total loss of initiation capability for 7 days (as allowed by Required Action E.2) is allowed during MODES 4 and 5. A Note is also provided (Note 2 to Required Action E.1) to delineate that Required Action E.1 is only applicable to low pressure ECCS Functions. Required Action E.1 is not applicable to HPCI Function 3.f since the loss of one channel results in a loss of the Function (one-out-of-one logic). This loss was considered during the development of Reference 4 and considered acceptable for the 7 days allowed by Required Action E.2.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal

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BASES

ACTIONS

E.1 and E.2 (continued)

"time zero" for beginning the allowed outage time "clock." For Required Action E.1, the Completion Time only begins upon discovery that a redundant feature in the same system (e.g., both CS subsystems) cannot be automatically initiated due to inoperable channels within the same Function as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration of channels.

If the instrumentation that controls the pump minimum flow valve is inoperable, such that the valve will not automatically open, extended pump operation with no injection path available could lead to pump overheating and failure. If there were a failure of the instrumentation, such that the core spray valve would not automatically close, a portion of the pump flow could be diverted from the reactor vessel injection path, causing insufficient core cooling. The low pressure coolant injection minimum flow valve is assumed to remain open during injection. These consequences can be averted by the operator's manual control of the valve, which would be adequate to maintain ECCS pump protection and required flow. Furthermore, other ECCS pumps would be sufficient to complete the assumed safety function if no additional single failure were to occur. The 7 day Completion Time of Required Action E.2 to restore the inoperable channel to OPERABLE status is reasonable based on the remaining capability of the associated ECCS subsystems, the redundancy available in the ECCS design, and the low probability of a DBA occurring during the allowed out of service time. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, Condition H must be entered and its Required Action taken. The Required Actions do not allow placing the channel in trip since this action would not necessarily result in a safe state for the channel in all events.

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BASES

ACTIONS (continued)

F.1 and F.2

Required Action F.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within similar ADS trip system A and B Functions result in redundant automatic initiation capability being lost for the ADS. Redundant automatic initiation capability is lost if either (a) one or more Function 4.a channels and one or more Function 5.a channels are inoperable and untripped or (b) one or more Function 4.b channels and one or more Function 5.b channels are inoperable and untripped.

In this situation (loss of automatic initiation capability), the 96 hour or 8 day allowance, as applicable, of Required Action F.2 is not appropriate and all ADS valves must be declared inoperable within 1 hour after discovery of loss of ADS initiation capability.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action F.1, the Completion Time only begins upon discovery that the ADS cannot be automatically initiated due to inoperable, untripped channels within similar ADS trip system Functions as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 8 days has been shown to be acceptable (Ref. 4) to permit restoration of any inoperable channel to OPERABLE status if both HPCI and RCIC are OPERABLE. If either HPCI or RCIC is inoperable, the time is shortened to 96 hours. If the status of HPCI or RCIC changes such that the Completion Time changes from 8 days to 96 hours, the 96 hours begins upon discovery of HPCI or RCIC inoperability. However, the total time for an inoperable, untripped channel cannot exceed 8 days. If the status of HPCI or RCIC changes such that the Completion Time changes

(continued)

BASES

ACTIONS

F.1 and F.2 (continued)

from 96 hours to 8 days, the "time zero" for beginning the 8 day "clock" begins upon discovery of the inoperable, untripped channel. 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 F.2. 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 initiation), Condition H must be entered and its Required Action taken.

G.1 and G.2

Required Action G.1 is intended to ensure that appropriate actions are taken if multiple, inoperable channels within similar ADS trip system Functions result in automatic initiation capability being lost for the ADS. Automatic initiation capability is lost if either (a) one Function 4.c channel and one Function 5.c channel are inoperable, (b) a combination of Function 4.d, 4.e, 5.d, and 5.e channels are inoperable such that channels associated with five or more low pressure ECCS pumps are inoperable, or (c) one Function 4.f channel and one Function 5.g channel are inoperable.

In this situation (loss of automatic initiation capability), the 96 hour or 8 day allowance, as applicable, of Required Action G.2 is not appropriate, and all ADS valves must be declared inoperable within 1 hour after discovery of loss of ADS initiation capability.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action G.1, the Completion Time only begins upon discovery that the ADS cannot be automatically

(continued)

BASES

ACTIONS

G.1 and G.2 (continued)

initiated due to inoperable channels within similar ADS trip system Functions as described in the paragraph above. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the diversity of sensors available to provide initiation signals and the redundancy of the ECCS design, an allowable out of service time of 8 days has been shown to be acceptable (Ref. 4) to permit restoration of any inoperable channel to OPERABLE status if both HPCI and RCIC are OPERABLE (Required Action G.2). If either HPCI or RCIC is inoperable, the time shortens to 96 hours. If the status of HPCI or RCIC changes such that the Completion Time changes from 8 days to 96 hours, the 96 hours begins upon discovery of HPCI or RCIC inoperability. However, the total time for an inoperable channel cannot exceed 8 days. If the status of HPCI or RCIC changes such that the Completion Time changes from 96 hours to 8 days, the "time zero" for beginning the 8 day "clock" begins upon discovery of the inoperable channel. If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, Condition H must be entered and its Required Action taken. The Required Actions do not allow placing the channel in trip since this action would not necessarily result in a safe state for the channel in all events.

H.1

With any Required Action and associated Completion Time not met, the associated feature(s) may be incapable of performing the intended function, and the supported feature(s) associated with inoperable untripped channels must be declared inoperable immediately.

SURVEILLANCE REQUIREMENTS

As noted in the beginning of the SRs, the SRs for each ECCS instrumentation Function are found in the SRs column of Table 3.3.5.1-1.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

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 as follows: (a) for Functions 3.c, 3.f, and 3.g; and (b) for Functions other than 3.c, 3.f, and 3.g provided the associated Function or redundant Function maintains ECCS 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 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 ECCS will initiate when necessary.

SR 3.3.5.1.1

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 something even more serious. A CHANNEL CHECK guarantees that undetected outright channel failure is limited to 12 hours; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

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.

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SURVEILLANCE REQUIREMENTS

SR 3.3.5.1.1 (continued)

The Frequency is based upon 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 3.3.5.1.2 and SR 3.3.5.1.4

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 31 days for SR 3.3.5.1.2 is based on engineering judgement and the reliability of the equipment. The Frequency of 92 days for SR 3.3.5.1.4 is based on the reliability analyses of Reference 4.

SR 3.3.5.1.3, SR 3.3.5.1.6 and SR 3.3.5.1.7

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 Frequency of SR 3.3.5.1.3 is based upon the assumption of a 60 day calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

The Frequency of SR 3.3.5.1.6 is based upon 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 3.3.5.1.7 is based upon the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.5.1.5

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 3.3.5.1-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analyses. Under these conditions, the setpoint must be readjusted to be equal to or more conservative than the setting accounted for in the appropriate setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of Reference 4.

SR 3.3.5.1.8

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.5.1, LCO 3.5.2, LCO 3.8.1, and LCO 3.8.2 overlaps this Surveillance to provide complete testing of the assumed safety function.

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 5.2.
2. UFSAR, Section 6.3.
3. UFSAR, Chapter 15.
4. NEDC-30936-P-A, "BWR Owners' Group Technical Specification Improvement Analyses for ECCS Actuation Instrumentation, Part 1 and Part 2," December 1988.

B 3.3 INSTRUMENTATION

B 3.3.5.2 Reactor Core Isolation Cooling (RCIC) System Instrumentation

BASES

BACKGROUND

The purpose of the RCIC System instrumentation is to initiate actions to ensure adequate makeup water when the reactor vessel is isolated from its primary heat sink (the main condenser) and normal coolant makeup flow from the Reactor Feedwater System is insufficient or unavailable, such that RCIC System initiation occurs and maintains sufficient reactor water level precluding initiation of the low pressure Emergency Core Cooling Systems (ECCS) pumps. A more complete discussion of RCIC System operation is provided in the Bases of LCO 3.5.3, "RCIC System."

The RCIC System may be initiated by either automatic or manual means. Automatic initiation occurs for conditions of Reactor Vessel Water Level – Low Low level. The variable is monitored by four level indicating switches. The outputs are connected to relays whose contacts are arranged in a one-out-of-two taken twice logic arrangement. The logic can also be initiated by use of a manual initiation push button. Once initiated, the RCIC logic seals in and can be reset by the operator only when the reactor vessel water level signals have cleared.

The RCIC test line isolation valve is closed on a RCIC initiation signal to allow full system flow to the reactor vessel.

The RCIC System also monitors the water levels in the contaminated condensate storage tanks (CCSTs) and the suppression pool since these are the two sources of water for RCIC operation. Reactor grade water in the CCST is the normal source. Upon receipt of a RCIC initiation signal, the CCST suction valve is automatically signaled to open (it is normally in the open position) unless both pump suction valves from the suppression pool are open. If the water level in any CCST falls below a preselected level, first the suppression pool suction valves automatically open, and then when these valves are fully open the CCST suction valve automatically closes. Two level switches are used to detect low water level in each CCST. The outputs for these

(continued)

BASES

BACKGROUND (continued)

switches are common between Units 1 and 2. Any switch can cause the suppression pool suction valves to open and the CCST suction valve to close. The suppression pool suction valves also automatically open and the CCST suction valve closes if high water level is detected in the suppression pool (one-out-of-two logic). To prevent losing suction to the pump, the suction valves are interlocked so that one suction path must be open before the other automatically closes.

The RCIC System provides makeup water to the reactor until the reactor vessel water level reaches the high water level trip (two-out-of-two logic), at which time the RCIC turbine steam supply valve, and minimum flow valve to the suppression pool close. The RCIC System automatically restarts if a Reactor Vessel Water Level – Low Low signal is subsequently received.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The function of the RCIC System to provide makeup coolant to the reactor is used to respond to transient events. The RCIC System is not an Engineered Safety Feature System and no credit is taken in the safety analyses for RCIC System operation. Based on its contribution to the reduction of overall plant risk, however, the RCIC System, and therefore its instrumentation, meets Criterion 4 of 10 CFR 50.36(c)(2)(ii). Certain instrumentation Functions are retained for other reasons and are described below in the individual Functions discussion.

The OPERABILITY of the RCIC System instrumentation is dependent upon the OPERABILITY of the individual instrumentation channel Functions specified in Table 3.3.5.2-1. Each Function must have a required number of OPERABLE channels with their setpoints within the specified Allowable Values, where appropriate. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions.

Allowable Values are specified for each RCIC System instrumentation 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

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

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 (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 (or design limits) are derived from the limiting values of the process parameters obtained from the safety analysis. The trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

The individual Functions are required to be OPERABLE in MODE 1, and in MODES 2 and 3 with reactor steam dome pressure > 150 psig since this is when RCIC is required to be OPERABLE. Refer to LCO 3.5.3 for Applicability Bases for the RCIC System.

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

1. Reactor Vessel Water Level – Low Low

Low reactor pressure vessel (RPV) water level indicates that normal feedwater flow is insufficient to maintain reactor vessel water level and that the capability to cool the fuel

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APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1. Reactor Vessel Water Level – Low Low (continued)

may be threatened. Should RPV water level decrease too far, fuel damage could result. Therefore, the RCIC System is initiated at Reactor Vessel Water Level – Low Low to assist in maintaining water level above the top of the active fuel.

Reactor Vessel Water Level – Low Low signals are initiated from four level indicating switches 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.

The Reactor Vessel Water Level – Low Low Allowable Value is set high enough such that for complete loss of feedwater flow, the RCIC System flow with high pressure coolant injection assumed to fail will be sufficient to avoid injection of low pressure ECCS.

Four channels of Reactor Vessel Water Level – Low Low Function are available and are required to be OPERABLE when RCIC is required to be OPERABLE to ensure that no single instrument failure can preclude RCIC initiation. Refer to LCO 3.5.3 for RCIC Applicability Bases.

2. Reactor Vessel Water Level – High

High RPV water level indicates that sufficient cooling water inventory exists in the reactor vessel such that there is no danger to the fuel. Therefore, the Reactor Vessel Water Level – High signal is used to close the RCIC turbine steam supply valve, to prevent overflow into the main steam lines (MSLs). The minimum flow valve to the suppression pool also closes.

Reactor Vessel Water Level – High signals for RCIC are initiated from two level indicating switches from the narrow range water level measurement instrumentation, which 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.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2. Reactor Vessel Water Level — High (continued)

The Reactor Vessel Water Level — High Allowable Value is high enough to preclude isolating the injection valve of the RCIC during normal operation, yet low enough to trip the RCIC System prior to water overflowing into the MSLs.

Two channels of Reactor Vessel Water Level — High Function are available and are required to be OPERABLE when RCIC is required to be OPERABLE to ensure that no single instrument failure can preclude RCIC initiation. Refer to LCO 3.5.3 for RCIC Applicability Bases.

3. Contaminated Condensate Storage Tank Level — Low

Low level in a CCST indicates the unavailability of an adequate supply of makeup water from this normal source. Normally, the suction valve between the RCIC pump and the CCST is open and, upon receiving a RCIC initiation signal, water for RCIC injection would be taken from the CCSTs. However, if the water level in the CCSTs fall below a preselected level, first the suppression pool suction valves automatically open, and then the CCST suction valve automatically closes. This ensures that an adequate supply of makeup water is available to the RCIC pump. To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valves must be open before the CCST suction valve automatically closes.

Two level switches are used to detect low water level in each CCST. The Contaminated Condensate Storage Tank Level — Low Function Allowable Value is set high enough to ensure adequate pump suction head while water is being taken from the CCST.

Any two channels of Contaminated Condensate Storage Tank Level — Low Function are available and are required to be OPERABLE when RCIC is required to be OPERABLE and when both CCSTs are aligned to the RCIC System or two channels associated with the CCST aligned to RCIC, when one CCST is isolated from the unit RCIC System. These requirements will ensure that no single instrument failure can preclude RCIC swap to suppression pool source. Refer to LCO 3.5.3 for RCIC Applicability Bases.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

4. Suppression Pool Water Level - High

Excessively high suppression pool water level could result in the loads on the suppression pool exceeding design values should there be a blowdown of the reactor vessel pressure through the relief valves. Therefore, signals indicating high suppression pool water level are used to transfer the suction source of RCIC from the CCSTs to the suppression pool to eliminate the possibility of RCIC continuing to provide additional water from a source outside primary containment. This Function satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). To prevent losing suction to the pump, the suction valves are interlocked so that the suppression pool suction valves must be open before the CCST suction valve automatically closes.

Suppression pool water level signals are initiated from two level switches. The Allowable Value for the Suppression Pool Water Level - High Function is set low enough to ensure that RCIC will be aligned to take suction from the suppression pool before the water level reaches the point at which suppression design loads would be exceeded. The Allowable Value is confirmed by performance of a CHANNEL FUNCTIONAL TEST. This is acceptable since the design layout of the installation ensures the switches will trip at a level lower than the Allowable Value.

Two channels of Suppression Pool Water Level - High Function are available and are required to be OPERABLE when RCIC is required to be OPERABLE to ensure that no single instrument failure can preclude RCIC swap to suppression pool source. Refer to LCO 3.5.3 for RCIC Applicability Bases.

5. Manual Initiation

The Manual Initiation push button switch introduces a signal into the RCIC System initiation logic that is redundant to the automatic protective instrumentation and provides manual initiation capability. There is one push button for the RCIC System.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

5. Manual Initiation (continued)

The Manual Initiation Function is not assumed in any accident or transient analyses in the UFSAR. However, the Function is retained for overall redundancy and diversity of the RCIC function as required by the NRC in the plant licensing basis.

There is no Allowable Value for this Function since the channel is mechanically actuated based solely on the position of the push button. One channel of Manual Initiation is required to be OPERABLE when RCIC is required to be OPERABLE.

ACTIONS

A Note has been provided to modify the ACTIONS related to RCIC 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 RCIC 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 RCIC System instrumentation channel.

A.1

Required Action A.1 directs entry into the appropriate Condition referenced in Table 3.3.5.2-1. The applicable Condition referenced in the Table is Function dependent. Each time a required channel is discovered to be inoperable, Condition A is entered for that channel and provides for transfer to the appropriate subsequent Condition.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

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 complete loss of automatic initiation capability for the RCIC System. In this case, automatic initiation capability is lost if two Function 1 channels in the same trip system are inoperable and untripped. In this situation (loss of automatic initiation capability), the 24 hour allowance of Required Action B.2 is not appropriate, and the RCIC System must be declared inoperable within 1 hour after discovery of loss of RCIC initiation capability.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action B.1, the Completion Time only begins upon discovery that the RCIC System cannot be automatically initiated due to two inoperable, untripped Reactor Vessel Water Level - Low Low channels in the same trip system. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the redundancy of sensors available to provide initiation signals and the fact that the RCIC System is not credited in any accident or transient analysis, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 1) to permit restoration of any 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 tripped condition per Required Action B.2. 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 initiation), Condition E must be entered and its Required Action taken.

(continued)

ACTIONS (continued)

C.1

A risk based analysis was performed and determined that an allowable out of service time of 24 hours (Ref. 1) is acceptable to permit restoration of any inoperable channel to OPERABLE status (Required Action C.1). A Required Action (similar to Required Action B.1) limiting the allowable out of service time, if a loss of automatic RCIC initiation capability exists, is not required. This Condition applies to the Reactor Vessel Water Level — High Function whose logic is arranged such that any inoperable channel will result in a loss of automatic RCIC initiation (high water level trip) capability. As stated above, this loss of automatic RCIC initiation (high water level trip) capability was analyzed and determined to be acceptable. This Condition also applies to the Manual Initiation Function. This is allowed since this Function is not assumed in any accident or transient analysis, thus a total loss of manual initiation capability (Required Action C.1) for 24 hours is allowed. The Required Action does not allow placing a channel in trip since this action would not necessarily result in a safe state for the channel in all events.

D.1, D.2.1, and D.2.2

Required Action D.1 is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same Function result in automatic initiation capability being lost for the the RCIC System. In this case if both CCSTs are available RCIC automatic initiation (RCIC source swap over) capability is lost if four Function 3 channels (2 of the required channels) are inoperable and untripped. If one CCST is not available, automatic initiation capability is lost if two channels associated with the aligned CCST are inoperable and untripped. In addition, automatic initiation (RCIC source swap over) capability is lost if two Function 4 channels are inoperable and untripped. In this situation (loss of automatic suction swap), the 24 hour allowance of Required Actions D.2.1 and D.2.2 is not appropriate, and the RCIC System must be declared inoperable within 1 hour from discovery of loss of RCIC initiation capability. As noted, Required Action D.1 is only applicable if the RCIC pump suction is not aligned to the suppression pool since, if aligned, the Function is already performed.

(continued)

ACTIONS

D.1, D.2.1, and D.2.2 (continued)

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action D.1, the Completion Time only begins upon discovery that the RCIC System cannot be automatically aligned to the suppression pool due to two inoperable, untripped channels in the same Function. The 1 hour Completion Time from discovery of loss of initiation capability is acceptable because it minimizes risk while allowing time for restoration or tripping of channels.

Because of the redundancy of sensors available to provide initiation signals and the fact that the RCIC System is not assumed in any accident or transient analysis, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 1) to permit restoration of any 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 tripped condition per Required Action D.2.1, which performs the intended function of the channel (shifting the suction source to the suppression pool). Alternatively, Required Action D.2.2 allows the manual alignment of the RCIC suction to the suppression pool, which also performs the intended function. If Required Action D.2.1 or D.2.2 is performed, measures should be taken to ensure that the RCIC System piping remains filled with water. If it is not desired to perform Required Actions D.2.1 and D.2.2 (e.g., as in the case where shifting the suction source could drain down the RCIC suction piping), Condition E must be entered and its Required Action taken.

E.1

With any Required Action and associated Completion Time not met, the RCIC System may be incapable of performing the intended function, and the RCIC System must be declared inoperable immediately.

continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

As noted in the beginning of the SRs, the SRs for each RCIC System instrumentation Function are found in the SRs column of Table 3.3.5.2-1.

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 Conditions and Required Actions may be delayed as follows: (a) for up to 6 hours for Functions 2 and 5; and (b) for up to 6 hours for Functions 1, 3, and 4, provided the associated Function maintains RCIC 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 the reliability analysis (Ref. 1) 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 RCIC will initiate when necessary.

SR 3.3.5.2.1

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 parameter on other similar 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.

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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.2.1 (continued)

The Frequency is based upon 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 3.3.5.2.2 and SR 3.3.5.2.4

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function.

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

The 31 day Frequency of SR 3.3.5.2.2 is based on the reliability of the components.

The 92 day Frequency of SR 3.3.5.2.4 is based on the reliability analysis of Reference 1.

SR 3.3.5.2.3 and SR 3.3.5.2.5

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 Frequency of SR 3.3.5.2.3 is based upon the assumption of a 60 day calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

The Frequency of SR 3.3.5.2.5 is based upon the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.5.2.6

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.5.3 overlaps this Surveillance to provide complete testing of the safety function.

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. GENE-770-06-2A, "Addendum to Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," December 1992.

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 the analyses for a DBA.

The isolation instrumentation includes the sensors, 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 temperatures, (c) main steam line (MSL) flow measurement, (d) Standby Liquid Control (SLC) System initiation, (e) main steam line pressure, (f) high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) steam line flow, (g) drywell radiation and pressure, (h) HPCI and RCIC steam line pressure, and (i) reactor vessel pressure. Redundant sensor input signals from each parameter are provided for initiation of isolation. The only exception is SLC System initiation.

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

(continued)

BASES

BACKGROUND (continued)

1. Main Steam Line Isolation

The Reactor Vessel Water Level – Low Low, the Main Steam Line Pressure – Low, and the Main Steam Line Pressure – Timer Functions receive inputs from four channels. One channel associated with each Function inputs to one of four trip strings. Two trip strings make up a trip system and both trip systems must trip to cause an isolation. of all main steam isolation valves (MSIVs), MSL drain valves, and recirculation loop sample isolation valves. Any channel will trip the associated trip string. Only one trip string must trip to trip the associated trip system. The trip strings are arranged in a one-out-of-two taken twice logic to initiate isolation.

The Main Steam Line Flow – High Function uses 16 flow channels, four for each steam line. One channel from each steam line inputs to one of the four trip strings. Two trip strings make up each trip system and both trip systems must trip to cause an isolation of all MSIVs, MSL drain valves, and recirculation sample isolation valves. Each trip string has four inputs (one per MSL), any one of which will trip the trip string. The trip strings are arranged in a one-out-of-two taken twice logic. This is effectively a one-out-of-eight taken twice logic arrangement to initiate isolation.

The Main Steam Line Tunnel Temperature – High Function receives input from 16 channels, four for each of the four tunnel areas. The logic is arranged similar to the Main Steam Line Flow – High Function. One channel from each steam tunnel area inputs to one of four trip strings. Two trip strings make up a trip system and both trip systems must trip to cause an isolation.

MSL Isolation Functions isolate the Group 1 valves.

2. Primary Containment Isolation

The Reactor Vessel Water Level – Low and Drywell Pressure – High Functions receive inputs from four channels. One channel associated with each Function inputs to one of four trip strings. Two trip strings make up a trip system and both trip systems must trip to cause an isolation of the PCIVs identified in Reference 1. Any channel will trip the

(continued)

BASES

BACKGROUND

2. Primary Containment Isolation (continued)

associated trip string. Only one trip string must trip to trip the associated trip system. The trip strings are arranged in a one-out-of-two taken twice logic to initiate isolation.

The Drywell Radiation – High Function receives input from two radiation detector assemblies each connected to a switch. Each switch actuates two contacts. Each contact inputs to one of four trip strings. Two trip strings make up a trip system and both trip systems must trip to cause an isolation of the PCIVs identified in Reference 1. The contacts associated with the same switch provide input to both trip strings in the same trip system. Any contact will trip the associated trip string. The trip strings are arranged in a one-out-of-two taken twice logic. For the purpose of this Specification, a channel is considered to include a radiation detector assembly, a switch, and one of two contacts.

Primary Containment Isolation Functions isolate the Group 2 valves.

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

The HPCI Steam Flow – High and HPCI Steam Flow Timer Functions each receive 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 the HPCI Steam supply penetration. The RCIC Steam Flow—High and RCIC Steam Flow—Timer Functions each receive input from two channels. Each channel is connected to two trip systems, each using a one-out-of-two logic. Each of the two trip systems is connected to both RCIC steam supply isolation valves, such that any trip system will isolate both valves. For the purpose of this Specification, two RCIC Steam Flow—High Function channels and the associated RCIC Steam Flow—Timers must be OPERABLE (one separate channel for each trip system).

The HPCI and RCIC Steam Supply Line Pressure – Low Functions receive inputs from four steam supply pressure channels for each system. The outputs from HPCI steam supply pressure

(continued)

BASES

BACKGROUND

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

channels are each connected to two two-out-of-two trip systems. Each trip system isolates one valve on the HPCI steam supply penetration. The RCIC Steam Supply Line Pressure — Low channels are arranged in a one one-out-of-two twice trip system. The trip system is connected to both RCIC steam supply isolation valves.

The HPCI Drywell Pressure — High Function receives input from four channels. Two channels provide input to one trip system and the other two channels provide input to a second trip system. In addition, four HPCI Steam Supply Line Pressure — Low Function channels are also connected to these trip systems. Each of the two trip systems receives input from two additional HPCI Steam Supply Line Pressure — Low Function channels. Each trip system is arranged such that one channel associated with each Function must trip in order to initiate isolation of one HPCI vacuum breaker isolation valve. The logic in each trip system is one-out-of-two for each Function.

The HPCI Turbine Area Temperature — High Function receives input from four channels. Two channels monitor the area near the steam supply line while the other two channels monitor the temperature near the turbine exhaust rupture disc. Each of the two trip systems receives input from one channel in each of the two areas. Each trip system is arranged such that both channels must trip in order to initiate isolation. This is effectively a two-out-of-two logic arrangement. Each of the two trip systems is connected to one of the two valves on the HPCI steam supply penetration. The RCIC Turbine Area Temperature — High Function receives input from four channels. The four channels monitor the area near the RCIC turbine. Each of the two trip systems receives input from the four channels. Each trip system is arranged in a one-out-of-two taken twice logic to initiate isolation. Each of the two trip systems is connected to both RCIC steam supply isolation valves, such that any trip system will isolate both valves. For the purpose of this Specification, two unique RCIC Turbine Area Temperature — High Function channels must be OPERABLE to support each trip system such that with both channels tripped in a trip system an isolation signal will occur.

(continued)

BACKGROUND

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

HPCI and RCIC Functions isolate the Group 4 and 5 valves, as appropriate.

5. Reactor Water Cleanup System Isolation

The Reactor Vessel Water Level - Low Isolation Function receives input from four reactor vessel water level channels. One channel associated with each Function inputs to one of four trip stings. Two trip strings make up a trip system and both trip systems must trip to cause an isolation of the reactor water cleanup (RWCU) valves. Any channel will trip the associated trip string. Only one trip string must trip to trip the associated trip system. The trip strings are arranged in a one-out-of-two taken twice logic to initiate isolation. SLC System Initiation Function receives input from the SLC initiation switch. The switch provides trip signal inputs to both trip systems in any position other than "OFF". The other switch positions are SYS 1, SYS 2, SYS 1+2 and SYS 2+1. For the purpose of this Specification, the SLC initiation switch is considered to provide 1 channel input into each trip system. Each of the two trip systems is connected to one of the two RWCU valves.

RWCU Functions isolate the Group 3 valves.

6. Residual Heat Removal (RHR) Shutdown Cooling (SDC) System Isolation

The Reactor Vessel Water Level - Low Function receives input from four reactor vessel water level channels. One channel associated with each Function inputs to one of four trip stings. Two trip strings make up a trip system and both trip systems must trip to cause an isolation of the RHR SDC suction isolation valves. Any channel will trip the associated trip string. Only one trip string must trip to trip the associated trip system. The trip strings are arranged in a one-out-of-two taken twice logic to initiate isolation. The Reactor Vessel Pressure - High Function receives input from two channels, both of which provide

(continued)

BACKGROUND

6. Residual Heat Removal (RHR) Shutdown Cooling (SDC) System Isolation (continued)

input to both trip systems. Any channel will trip both trip systems. This is a one-out-of-two logic for each trip system. Each of the two trip systems is connected to one of the two valves on the RHR SDC suction penetration.

Shutdown Cooling System Isolation Functions isolate some Group 2 valves (RHR SDC suction isolation valves).

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The isolation signals generated by the primary containment isolation instrumentation are implicitly assumed in the safety analyses of References 3 and 4 to initiate closure of valves to limit offsite doses. Refer to LCO 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)," Applicable Safety Analyses Bases for more detail of the safety analyses.

Primary containment isolation instrumentation satisfies Criterion 3 of 10 CFR 50.35(c)(2)(ii). Certain instrumentation Functions are retained for other reasons and are described below in the individual Functions discussion.

The OPERABILITY of the primary containment instrumentation is dependent on the OPERABILITY of the individual instrumentation channel Functions specified in Table 3.3.6.1-1. Each Function must have a required number of OPERABLE channels, with their setpoints within the specified Allowable Values, where appropriate. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. Each channel must also respond within its assumed response time, where appropriate.

Allowable Values are specified for each Primary Containment Isolation 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. A channel is inoperable if its actual trip setpoint is not within its required

(continued)

BASES

APPLICABLE SAFETY ANALYSES LCO, and APPLICABILITY (continued)

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 (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 trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

Certain Emergency Core Cooling Systems (ECCS) valves (e.g., RHR containment spray isolation valves) also serve the dual function of automatic PCIVs. The signals that isolate these valves are also associated with the automatic initiation of the ECCS. Some instrumentation requirements and ACTIONS associated with these signals are addressed in LCO 3.3.5.1, "Emergency Core Cooling Systems (ECCS) Instrumentation," and are not included in this LCO.

In general, the individual Functions are required to be OPERABLE in MODES 1, 2, and 3 consistent with the Applicability for LCO 3.6.1.1, "Primary Containment." Functions that have different Applicabilities are discussed below in the individual Functions discussion.

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Main Steam Line Isolation

1.a. Reactor Vessel Water Level - Low Low

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 MSIVs and other interfaces with the reactor vessel occurs to prevent offsite dose limits from being exceeded. The Reactor Vessel Water Level - Low Low Function is one of the many Functions assumed to be OPERABLE and capable of providing isolation signals. The Reactor Vessel Water Level - Low Low Function associated with isolation is assumed in the analysis of the recirculation line break (Ref. 5). The isolation of the MSLs supports actions to ensure that offsite dose limits are not exceeded for a DBA.

Reactor vessel water level signals are initiated from four differential pressure 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 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 Allowable Value is chosen to be the same as the ECCS Reactor Vessel Water Level - Low Low Allowable Value (LCO 3.3.5.1) to ensure that the MSLs isolate on a potential loss of coolant accident (LOCA) to prevent offsite doses from exceeding 10 CFR 100 limits.

This Function isolates the Group 1 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 more 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

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

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

failure (Ref. 6). 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.)

The MSL low pressure signals are initiated from four pressure switches that are connected to the MSL header close to the turbine stop valves. The switches are arranged such that, even though physically separated from each other, each switch 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 prevent excessive RPV depressurization.

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. 6).

This Function isolates the Group 1 valves.

1.c Main Steam Line Pressure –Timer

The Main Steam Line Pressure – Timer is provided to prevent false isolations on low MSL pressure as a result of pressure transients, however, the timer must function in a limited time period to support the OPERABILITY of the Main Steam Line Pressure – Low Function by enabling the associated channels after a certain time delay. The Main Steam Line Pressure – Timer is directly assumed in the analysis of the pressure regulator failure (Ref. 6). For this event, the closure of the MSIVs ensures that the RPV temperature 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.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.c Main Steam Line Pressure—Timer (continued)

The MSL low pressure timer signals are initiated when the associated MSL low pressure switch actuates. Four channels of Main Steam Line Pressure—Timer 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 be long enough to prevent false isolations due to pressure transients but short enough as to prevent excessive RPV depressurization.

This Function isolates the Group 1 valves.

1.d. 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. 7). 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 differential pressure switches that are connected to the four MSLs (the differential pressure switches sense differential pressure across a flow restrictor). The differential pressure switches 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 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.

This Function isolates the Group 1 valves.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

1.e. Main Steam Line Tunnel Temperature - High

Main steam line tunnel temperature is provided to detect a leak in the RCPB in the steam tunnel and provides diversity to the high flow instrumentation. Temperature is sensed in four different areas of the steam tunnel above each main steam line. The isolation occurs when a very small leak has occurred in any one of the four areas. 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 UFSAR, since bounding analyses are performed for large breaks, such as MSLBs.

Main steam line tunnel temperature signals are initiated from bimetallic temperature switches located in the four areas being monitored. Even though physically separated from each other, any temperature switch in any of the four areas is able to detect a leak. Sixteen channels of Main Steam Line Tunnel Temperature - High Function are available, but only eight channels (two channels in each of the four trip strings) are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Main Steam Line Tunnel Temperature - High Allowable Value is chosen to detect a leak equivalent to between 1% and 10% rated steam flow.

These Functions isolate the Group 1 valves.

Primary Containment Isolation

2.a. Reactor Vessel Water Level - Low

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 low RPV water level supports actions to ensure that offsite dose limits of 10 CFR 100 are not exceeded. The Reactor Vessel Water Level - Low Function associated with isolation is implicitly assumed in the UFSAR analysis as these leakage paths are assumed to be isolated post LOCA.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

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

Reactor Vessel Water Level - Low signals are initiated from differential pressure 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 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 Allowable Value was chosen to be the same as the RPS Reactor Vessel Water Level - Low 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 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 UFSAR accident analysis as these leakage paths are assumed to be isolated post LOCA.

High drywell pressure signals are initiated from pressure switches that sense the pressure in the drywell. Four 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 RPS Drywell Pressure - High scram Allowable Value (LCO 3.3.1.1), since this may be indicative of a LOCA inside primary containment.

This Function isolates the Group 2 valves.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

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 UFSAR because other leakage paths (e.g., MSIVs) are more limiting.

The drywell radiation signals are initiated from radiation detectors that are located in capped drywell penetrations. 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 Group 2 valves.

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 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.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

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

The HPCI Steam Line Flow — High signals are initiated from differential pressure transmitters while the RCIC Steam Line Flow — High signals are initiated from differential pressure switches 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 4 and 5 valves, as appropriate.

3.b, 4.b. HPCI and RCIC Steam Line Flow — Timer

The HPCI and RCIC Steam Line Flow — Timer is provided to prevent false isolations on HPCI or RCIC Steam Line Flow — High, as applicable, during system startup transients and therefore improves system reliability. These Functions are not assumed in any UFSAR transient or accident analyses since the bounding analysis is performed for large breaks such as recirculation and MSL breaks. However, these instruments support prevention of the HPCI and RCIC steam line breaks from becoming bounding.

The HPCI and RCIC Steam Line Flow — Timer Function delays the HPCI and RCIC Steam Line Flow — High signals, respectively by use of time delay relays. When a HPCI or RCIC Steam Line Flow — High signal is generated, the time delay relays delay the tripping of the associated HPCI or RCIC isolation trip system for a short time. Two channels of both HPCI and RCIC Steam Line Flow — Timer 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 long enough to prevent false isolations due to system starts but not so long as to impact offsite dose calculations.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.b, 4.b. HPCI and RCIC Steam Line Flow-Timer (continued)

These Functions, in conjunction with the HPCI and RCIC Steam Line Flow-High Functions, isolate the Group 4 and 5 valves, as appropriate.

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

Low HPCI or RCIC steam supply line pressure, as applicable, indicates that the pressure of the steam in the HPCI or RCIC turbine may be too low to continue operation of the associated system 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. Therefore, they meet Criterion 4 of 10 CFR 50.36(c)(2)(ii).

The HPCI Steam Supply Line Pressure-Low signals are initiated from pressure transmitters while the RCIC Steam Supply Line Pressure-Low signals are initiated from pressure switches 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. As noted (Note (a) to Table 3.3.6.1-1), for Function 4.c, this Function only inputs into one trip system. The trip system is connected to both RCIC steam supply isolation valves.

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

These Functions isolate the Group 4 and 5 valves, as appropriate.

3.d. Drywell Pressure-High

High drywell pressure can indicate a break in the RCPB. The HPCI 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

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.d. Drywell Pressure—High (continued)

unavailable for injection (i.e., low HPCI steam line pressure). The isolation of the HPCI turbine exhaust by Drywell Pressure—High is indirectly assumed in the UFSAR accident analysis because the turbine exhaust leakage path is not assumed to contribute to offsite doses.

High drywell pressure signals are initiated from pressure switches that sense the pressure in the drywell. Four channels of HPCI 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 RPS Drywell Pressure—High Allowable Value (LCO 3.3.1.1), since this is indicative of a LOCA inside primary containment.

This Function isolates the Group 4 HPCI turbine exhaust vacuum breaker valves.

3.e., 4.d. HPCI and RCIC Turbine Area Temperature—High

HPCI and RCIC turbine 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.

HPCI and RCIC Turbine Area Temperature—High signals are initiated from thermocouples that are appropriately located to detect a leak from the system piping that is being monitored. Four instruments monitor the RCIC area and four channels monitor each HPCI area. Four channels for HPCI and RCIC Turbine 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 low enough to detect a leak equivalent to 25 gpm.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

3.e., 4.d. HPCI and RCIC Turbine Area Temperature - High (continued)

These Functions isolate the Group 4 and 5 valves, as appropriate.

Reactor Water Cleanup System Isolation

5.a. 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 SLC initiation switch.

Two channels 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).

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.

This Function isolates the Group 3 valves.

5.b. Reactor Vessel Water Level - Low

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 low RPV water level supports actions to ensure that the fuel peak cladding temperature remains below the limits of 10 CFR 50.46. The Reactor Vessel Water Level - Low 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).

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

5.b. Reactor Vessel Water Level - Low (continued)

Reactor Vessel Water Level - Low signals are initiated from four differential pressure 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 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 Allowable Value was chosen to be the same as the RPS Reactor Vessel Water Level - Low Allowable Value (LCO 3.3.1.1), since the capability to cool the fuel may be threatened.

This Function isolates the Group 3 valves.

Residual Heat Removal (RHR) Shutdown Cooling (SDC) System Isolation

6.a. Reactor Vessel Pressure - High

The Reactor Vessel Pressure - High Function is provided to isolate the shutdown cooling portion of the Residual Heat Removal (RHR) System. This interlock is provided only for equipment protection to prevent an intersystem LOCA scenario, and credit for the interlock is not assumed in the accident or transient analysis in the UFSAR.

The Reactor Vessel Pressure - High signals are initiated from two pressure switches that are connected to different taps on the reactor recirculation loop B suction line. Two channels (both providing input into two trip systems) of Reactor Vessel Pressure - High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function. The Function is only required to be OPERABLE in MODES 1, 2, and 3, since these are the only MODES in which the reactor can be pressurized; thus, equipment protection is needed. The Allowable Value was chosen to be low enough to protect the system equipment from overpressurization.

This Function isolates the Group 2 residual heat removal shutdown cooling suction and injection valves.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

6.b. Reactor Vessel Water Level - Low

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 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 recirculation and MSL. The RHR Shutdown Cooling System isolation on low RPV water level 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 signals are initiated from four differential pressure 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 Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function. As noted (footnote (b) to Table 3.3.6.1-1), only one channel per trip system (with an isolation signal available to one shutdown cooling pump suction isolation valve) of the Reactor Vessel Water Level—Low Function is required to be OPERABLE in MODES 4 and 5, provided the Shutdown Cooling System integrity is maintained. System integrity is maintained provided the piping is intact and no maintenance is being performed that has the potential for draining the reactor vessel through the system.

The Reactor Vessel Water Level - Low Allowable Value was chosen to be the same as the RPS Reactor Vessel Water Level - Low Allowable Value (LCO 3.3.1.1), since the capability to cool the fuel may be threatened.

The Reactor Vessel Water Level - Low 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

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

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

to the top of the fuel. In MODES 1 and 2, another isolation (i.e., Reactor Steam Dome 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 the Group 2 residual heat removal shutdown cooling suction and injection valves.

ACTIONS

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 or 24 hours, depending on the Function (12 hours for those Functions that have channel components common to RPS instrumentation and 24 hours for those Functions that do not have channel components common to RPS instrumentation), has been shown to be acceptable (Refs. 9 and 10) 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.

(continued)

ACTIONS

A.1 (continued)

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 automatic isolation capability being lost for the associated penetration flow path(s). The MSL and Primary Containment Isolation Functions and portions of other system 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. For Functions 1.a, 1.b, 1.c, 2.a, 2.b, 2.c, 5.b, 6.a, and 6.b, this would require both trip systems to have one channel OPERABLE or in trip. For Function 1.d, this would require both trip systems to have one channel, associated with each MSL, OPERABLE or in trip. Function 1.e, consists of channels that monitor several locations within a given area (e.g., different locations within the main steam tunnel area). However, any channel in any of the four areas is able to detect a leak. Therefore, this would require both trip systems to have one channel OPERABLE or in trip. The HPCI, RCIC and portions of other system 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 3.c (associated with HPCI steam supply isolation), 3.e, and 4.d, this would require one trip system to have two channels, each OPERABLE or in trip. For Functions 3.a, 3.b, 3.c (associated with HPCI vacuum breaker isolation), 3.d, 4.a, 4.b, and 5.a, this would require one trip system to

(continued)

ACTIONS

B.1 (continued)

have one channel OPERABLE or in trip. For Function 4.c this would require two or more channels to be OPERABLE or in trip in the trip system.

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

Required Action C.1 directs entry into the appropriate Condition referenced in Table 3.3.6.1-1. The applicable Condition specified in Table 3.3.6.1-1 is Function and MODE or other specified condition dependent and may change as the Required Action of a previous Condition is completed. Each time an inoperable channel has not met any Required Action of Condition A or B and the associated Completion Time has expired, Condition C will be entered for that channel and provides for transfer to the appropriate subsequent Condition.

D.1, D.2.1, and D.2.2

If the channel is not restored to OPERABLE status or placed in trip within the allowed Completion Time the associated MSLs may be isolated (Required Action D.1), and, if allowed (i.e., plant safety analysis allows operation with an MSL isolated), operation with that MSL isolated may continue. Isolating the affected MSL accomplishes the safety function of the inoperable channel. This Required Action will generally only be used if a Function 1.c channel is inoperable and untripped. The associated MSL(s) to be isolated are those whose Main Steam Line Flow — High Function channel(s) are inoperable. Alternately, 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 (Required Actions D.2.1 and D.2.2). The Completion Times

(continued)

ACTIONS

D.1, D.2.1, and D.2.2 (continued)

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.

E.1

If the channel is not restored to OPERABLE status or placed in trip within the allowed Completion Time, 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 2 within 8 hours.

The allowed Completion Time of 8 hours is reasonable, based on operating experience, to reach MODE 2 from full power conditions in an orderly manner and without challenging plant systems.

F.1

If the channel is not restored to OPERABLE status or placed in trip within the allowed Completion Time, plant operations 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 channel.

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.

The 1 hour Completion Time is acceptable because it minimizes risk while allowing sufficient time for plant operations personnel to isolate the affected penetration flow path(s).

(continued)

ACTIONS (continued)

G.1 and G.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 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.

H.1 and H.2

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.

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

I.1 and I.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.

(continued)

SURVEILLANCE REQUIREMENTS

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 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. 9 and 10) 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.

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.

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.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.6.1.1 (continued)

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 channel will perform the intended function. 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 analyses described in References 9 and 10.

SR 3.3.6.1.3

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 3.3.6.1-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel 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 that accounted for in the appropriate setpoint methodology.

The Frequency of 92 days is based on the reliability analyses of References 9 and 10.

SR 3.3.6.1.4 and SR 3.3.6.1.5

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.1.4 and SR 3.3.6.1.5 (continued)

adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequency of SR 3.3.6.1.4 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 3.3.6.1.5 is based on the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.6.1.6

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required isolation logic for a specific channel. The system functional testing performed on PCIVs in LCO 3.6.1.3 overlaps this Surveillance to provide complete testing of the assumed safety function. 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, Table 6.2-7.
2. 10 CFR 50.62.
3. UFSAR, Section 6.2.
4. UFSAR, Chapter 15.
5. UFSAR, Section 15.6.5.
6. UFSAR, Section 15.1.3.
7. UFSAR, Section 15.6.4.

(continued)

BASES

REFERENCES (continued)

8. UFSAR, Section 9.3.5.

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

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

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 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 high radiation, and (4) refueling floor high radiation. Redundant sensor input signals from each parameter are provided for initiation of isolation.

For both the Reactor Vessel Water Level – Low and Drywell Pressure – High Function, the secondary containment isolation logic receives input from four channels. One channel associated with each Function inputs to one of four trip strings. Two trip strings make up a trip system and both trip systems must trip to initiate the secondary containment isolation function. Any channel will trip the associated trip string. Any trip string will trip the associated trip system. The trip strings are arranged in a one-out-of-two taken twice logic to initiate the secondary containment

(continued)

BACKGROUND (continued)

isolation function. For both Reactor Building Exhaust Radiation—High and Refueling Floor Radiation—High Functions, the secondary containment isolation trip system logic receives input from four channels. Two channels of Reactor Building Exhaust Radiation—High are located in each of the unit reactor building exhaust ducts and two channels of Refueling Floor Radiation—High are located where they can monitor the environment of each of the unit spent fuel pools. The output of the channels associated with Unit 1 are provided to one trip system while the output of the channels associated with Unit 2 are provided to the other trip system. The output from these channels are arranged in two one-out-of-two trip system logics for each Function to initiate the secondary containment isolation function. Any Reactor Building Exhaust Radiation—High or Refueling Floor Radiation—High channel will initiate the secondary containment isolation function. Initiating the secondary containment isolation function provides an input to both secondary containment Train A and Train B logic. Either train initiates isolation of all secondary containment isolation valves and provides a start signal to the associated SGT subsystem.

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 2 and 3 to initiate closure of the SCIVs 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.

The secondary containment isolation instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). Certain instrumentation Functions are retained for other reasons and are described below in the individual Functions discussion.

The OPERABILITY of the secondary containment isolation instrumentation is dependent on the OPERABILITY of the individual instrumentation channel Functions. Each Function

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

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.

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. 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 (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 trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

In general, the individual Functions are required to be OPERABLE in the MODES or other specified conditions when SCIVs and the SGT System are required.

(continued)

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.

1. Reactor Vessel Water Level - Low

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. An isolation of the secondary containment and actuation of the SGT System are initiated in order to minimize the potential of an offsite dose release. The Reactor Vessel Water Level - Low Function is one of the Functions assumed to be OPERABLE and capable of providing isolation and initiation signals. The isolation and initiation of systems on Reactor Vessel Water Level - Low support actions to ensure that any offsite releases are within the limits calculated in the safety analysis (Ref. 2).

Reactor Vessel Water Level - Low signals are initiated from differential pressure 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 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 Allowable Value was chosen to be the same as the Reactor Protection System (RPS) Reactor Vessel Water Level - Low Allowable Value (LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation"), since this could indicate that the capability to cool the fuel is being threatened.

The Reactor Vessel Water Level - Low 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

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1. Reactor Vessel Water Level - Low (continued)

Function is also required to be OPERABLE during operations with a potential for draining the reactor vessel (OPDRVs) to ensure that offsite 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 dose release. The isolation and initiating of the systems on Drywell Pressure - High supports actions to ensure that any offsite releases are within the limits calculated in the safety analysis (Ref. 2).

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

The Allowable Value was chosen to be the same as the RPS Drywell Pressure - High Function Allowable Value (LCO 3.3.1.1) since this is indicative of a loss of coolant accident (LOCA).

The Drywell Pressure - High Function is required to be OPERABLE in MODES 1, 2, and 3 where considerable energy exists in the RCS; thus, there is a probability of pipe breaks resulting in significant releases of radioactive steam and gas. This Function is not required in MODES 4 and 5 because the probability and consequences of these events are low due to the RCS pressure and temperature limitations of these MODES.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

3, 4. Reactor Building Exhaust Radiation – High and Refueling Floor Radiation – High

High reactor building exhaust radiation or refuel floor 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 or the refueling floor due to a fuel handling accident. When Reactor Building Exhaust Radiation – High or Refueling Floor Radiation – High is detected, secondary containment isolation and actuation of the SGT System are initiated to support actions to limit the release of fission products as assumed in the UFSAR safety analyses (Refs. 2 and 3).

The Reactor Building Exhaust Radiation – High signals are initiated from radiation detectors that are located on the ventilation exhaust duct coming from the associated reactor building. Therefore, the channels must be declared inoperable if the associated reactor building ventilation exhaust duct is isolated. Refueling Floor Radiation – High signals are initiated from radiation detectors that are located to monitor the environment of the associated spent fuel storage pool. The signal from each detector is input to an individual monitor whose trip outputs are assigned to an isolation channel. Four channels of Reactor Building Exhaust Radiation – High Function and four channels of Refueling Floor 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.]

The Reactor Building Exhaust Radiation – High and Refueling Floor Radiation – High Functions are required to be OPERABLE in MODES 1, 2, and 3 where considerable energy exists in the 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, these Functions are not required. In addition, the Functions are also required to

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

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

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 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 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 or 24 hours depending on the Function (12 hours for those Functions that have channel components common to RPS instrumentation and 24 hours for those Functions that do not have channel components common to RPS instrumentation), has been shown to be acceptable (Refs. 4 and 5) 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

(continued)

ACTIONS

A.1 (continued)

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 complete loss of isolation capability for the associated penetration flow path(s) or a complete loss of initiation capability for the SGT System. A Function is considered to be maintaining isolation capability when sufficient channels are OPERABLE or in trip, such that a trip signal will be generated from the given Function on a valid signal. This ensures that the two SCIVs in the associated penetration flow path and the SGT System can be initiated on an isolation signal from the given Function. For the Functions with two one-out-of-two logic trip systems (Functions 1 and 2), this would require one trip system to have one channel OPERABLE or in trip. For Functions 3 and 4, this would require each trip system to have one channel OPERABLE or in trip.

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 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

(continued)

BASES

ACTIONS

C.1.1, C.1.2, C.2.1, and C.2.2 (continued)

maintain the secondary containment function. Isolating the associated penetration flow path(s) 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. The method used to place the SGT subsystem in operation must provide for automatically reinitiating the subsystem upon restoration of power following a loss of power to the SGT subsystem.

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 Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains 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. 4 and 5) 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.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

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.

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.

SR 3.3.6.2.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. 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 4 and 5.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.2.3

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 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 92 days is based on the reliability analysis of References 4 and 5.

SR 3.3.6.2.4 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 3.3.6.2.4 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 3.3.6.2.6

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.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.2.6 (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, Section 6.2.3.
2. UFSAR, Section 15.6.5.
3. UFSAR, Section 15.7.2.
4. NEDC-31677P-A, "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation," July 1990.
5. NEDC-30851P-A Supplement 2, "Technical Specifications Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," March 1989.

B 3.3 INSTRUMENTATION

B 3.3.6.3 Relief Valve Instrumentation

BASES

BACKGROUND

The low set portion of relief valve instrumentation is designed to mitigate the effects of postulated thrust loads on the relief valve discharge lines by preventing subsequent actuations with an elevated water leg in the discharge line. It also mitigates the effects of postulated pressure loads on the torus shell or suppression pool by preventing multiple actuations in rapid succession of the relief valve subsequent to their initial actuation. The low set function of relief valve instrumentation is contained within the control logic of the two relief valves that are set to initiate first on an overpressure event. The relief valve instrumentation, as a whole, is designed to mitigate the effects of overpressurization transients via the relief mode of five relief valves.

The relief valve instrumentation logic consists of separate channels for each of the five relief valves with each channel controlling one associated relief valve. Each channel contains a high pressure (PS_H) switch and a low pressure (PS_L) switch. The pressure switches sense reactor pressure from the upstream side of the relief valve to open the associated relief valve on a sensed high reactor pressure and close the valve following a reduction in reactor pressure. Actuation of the associated relief valve is accomplished via closure of the PS_H on a sensed high reactor pressure, which energizes the relief valve solenoid to open the valve. The PS_L closes to seal in the actuation signal and opens when reactor pressure has decreased below the low pressure setpoint of the switch to de-energize the solenoid and allow the relief valve to close.

The relief valve high pressure setpoints are set such that two of the five relief valves (i.e., the Low Set Relief Valves) will actuate at a pressure that is approximately twenty pounds lower than the remaining three relief valves (i.e., the Relief Valves). The lower pressure settings are intended to reduce the frequency of multiple relief discharges.

(continued)

BASES

BACKGROUND (continued)

Two Low Set Relief Valve Reactuation Time Delay channels are included in the associated control logic for the two relief valves designated to open at the lower reactor pressure (i.e., the Low Set Relief Valves). Each channel consists of a time delay dropout relay and its associated contacts. The channels are arranged in a two-out-of-two logic arrangement for each low set relief valve. The Low Set Relief Valve Reactuation Time Delay Function ensures a time delay of approximately 10 seconds occurs between the closure of the associated relief valve and any subsequent opening of the valve by preventing the reopening of the valve. In this fashion, the low set portion of relief valve instrumentation increases the time between (or prevents) subsequent actuations to allow the high water leg created from the initial relief valve opening to return to (or fall below) its normal water level; thus, reducing thrust loads from subsequent actuations to within their design limits.

APPLICABLE SAFETY ANALYSES

The relief valve instrumentation and low set function ensures that the containment loads remain within the primary containment design basis (Refs. 1 and 2). The opening setpoints of the relief valves also ensure that the transient analyses of Reference 3 can be met.

The relief valve instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO requires OPERABILITY of sufficient relief valve instrumentation channels to ensure successfully accomplishing the relief valve function assuming any single instrumentation channel failure. Therefore, the OPERABILITY of the relief valve instrumentation is dependent on the OPERABILITY of the instrumentation channel Function specified in Table 3.3.6.3-1. Each Function must have a required number of OPERABLE channels, with their setpoints within the specified Allowable Value. 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 relief valve actuation Function in Table 3.3.6.3-1. Nominal trip

(continued)

BASES

LCO (continued)

setpoints are specified in the setpoint calculations. The nominal setpoints are selected to ensure 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 pressure), 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 trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

The Low Set Relief Valve Reactuation Time Delay is based on preventing unacceptable thrust loads on relief valve discharge piping due to relief valve openings with elevated water leg conditions. The time delay setpoint was chosen to ensure the two low set relief valves will remain closed following their initial opening, until normal water level in the discharge line is restored and is based on the calculated worst case elevated water leg duration.

The relief valve Allowable Values are based on the safety analysis performed in References 1, 2, and 3.

APPLICABILITY

The relief valve instrumentation is required to be OPERABLE in MODES 1, 2, and 3 since considerable energy is in the

(continued)

BASES

APPLICABILITY (continued)

nuclear system and the relief valves may be needed to provide pressure relief. If the relief valves are needed, then the relief valve function is required to ensure that the primary containment design basis is maintained. In MODES 4 and 5, the reactor pressure is low enough that the overpressure limit cannot be approached by assumed operational transients or accidents. Thus, relief valve instrumentation and associated pressure relief is not required.

ACTIONS

A.1

The failure of any relief valve instrument channel to provide the pressure setpoint or low set time delay for an individual relief valve does not affect the ability of the other relief valves to perform their relief or low set function. A relief valve is OPERABLE if the associated logic, has one Function 1.a or 2.a channel, as applicable, and, for low set relief valves, two Function 1.b channels OPERABLE. Therefore, 14 days is provided to restore the inoperable channel(s) to OPERABLE status (Required Action A.1). If the inoperable channel(s) cannot be restored to OPERABLE status within the allowable out of service time, Condition B must be entered and its Required Action taken. The 14 day Completion Time is considered appropriate because of the redundancy in the design (five relief valves are provided and any four relief valves can perform the relief function, two low set relief valves are provided and one low set relief valve can perform the low set function) and the very low probability of multiple relief instrumentation channel failures, which render the remaining relief valves inoperable, occurring together with an event requiring the relief or low set function during the 14 day Completion Time. The 14 day Completion Time to restore inoperable channels to OPERABLE status is based on the relief capability of the remaining relief valves, the low probability of an event requiring relief valve actuation and a reasonable time to complete the Required Action.

(continued)

BASES

ACTIONS (continued)

B.1

If the Required Action and associated Completion Time of Condition A is not met, or two or more relief valves are inoperable due to inoperable channels, the relief valves may be incapable of performing their intended relief or low set function. Therefore, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs for each LLS instrumentation Function are located in the SRs column of Table 3.3.6.3-1.

SR 3.3.6.3.1

CHANNEL CALIBRATION is a complete check of the instrument loop and 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 of once every 24 months for SR 3.3.6.3.1 is based on the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.6.3.2

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required actuation logic for a specified channel. The system functional testing performed in LCO 3.4.3, "Safety and Relief Valves" and LCO 3.6.1.6, "Low Set Relief Valves," overlaps this test to provide complete testing of the assumed safety function.

(continued)

BASES

SURVEILLANCE REQUIREMENTS	SR 3.3.6.3.2 (continued) The Frequency of once every 24 months for SR 3.3.6.3.2 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, Figure 5.2.2. 2. UFSAR, Section 6.2.1.3.4. 3. UFSAR, Chapter 15.

B 3.3 INSTRUMENTATION

B 3.3.7.1 Control Room Emergency Ventilation (CREV) System Isolation Instrumentation

BASES

BACKGROUND

The CREV 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. The CREV System is capable of fulfilling the stated safety function. The instrumentation and controls for the CREV System automatically isolate the control room emergency zone to minimize the consequences of radioactive material in the control room environment.

In the event of a Reactor Vessel Water Level — Low, Drywell Pressure — High, Main Steam Line Flow — High, Refueling Floor Radiation — High, or Reactor Building Exhaust Radiation — High signal, the control room is automatically isolated.

For both the Reactor Vessel Water Level—Low and Drywell Pressure—High Functions, the CREV System isolation instrumentation logic receives input from four channels. The output from these channels are arranged into two one-out-of-two trip system logics. Both trip systems must trip to isolate the control room. The Main Steam Line Flow—High Function uses 16 channels, four for each main steam line. One channel from each main steam line inputs to one of the four trip strings. Two trip strings make up each trip system and both trip systems must trip to isolate the control room. Each trip string has four inputs (one per MSL), any one of which will trip the trip string. The trip strings are arranged in a one-out-of-two taken twice logic. This is effectively a one-out-of-eight taken twice logic arrangement to initiate isolation. For both Reactor Building Ventilation Exhaust Radiation—High and Refueling Floor Radiation—High Functions, the CREV System isolation logic receives input from four channels. Two channels associated with the Reactor Building Ventilation Exhaust Radiation—High Function are located in each reactor building exhaust duct while two channels associated with the Refueling Floor Radiation—High Function are located where they can monitor the environment of each of the unit spent fuel pools. The outputs of the channels associated with

(continued)

BASES

BACKGROUND (continued)

Unit 1 are provided to one trip system while the outputs of the channels associated with Unit 2 are provided to the other trip system. The outputs from these channels are arranged into two one-out-of-two trip system logics for each Function. A trip of any trip system will initiate the control room isolation function. Any Reactor Building Exhaust Radiation – High or Refueling Floor Radiation – High channel will initiate the control room isolation function. All Refueling Floor Radiation—High and Reactor Building Ventilation Exhaust Radiation—High Function channels are common to both Unit 1 and 2. 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 CREV System isolation signal to the initiation logic.

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

The ability of the CREV System to isolate and maintain the habitability of the control room emergency zone is explicitly assumed for certain accidents as discussed in the UFSAR safety analyses (Refs. 1, 2, and 3). CREV System isolation and 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.

CREV System isolation instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

The OPERABILITY of the CREV System isolation 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. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions.

Allowable Values are specified for each CREV System Isolation 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

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

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 (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 trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

1. Reactor Vessel Water Level - Low

Low reactor pressure vessel (RPV) water level indicates that the capability of cooling the fuel may be threatened. A low reactor vessel water level could indicate a LOCA and will automatically initiate isolation of the control room emergency zone, since this could be a precursor to a potential radiation release and subsequent radiation exposure to control room personnel.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1. Reactor Vessel Water Level - Low (continued)

Reactor Vessel Water Level - Low signals are initiated from four differential pressure 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 Function are available (two channels per trip system) and are required to be OPERABLE to ensure that a single instrument failure can preclude control room emergency zone isolation. The Reactor Vessel Water Level - Low Allowable Value was chosen to be the same as the Reactor Protection System (RPS) Reactor Vessel Water Level - Low Allowable Value (LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation").

The Reactor Vessel Water Level - Low Function is required to be OPERABLE in MODES 1, 2, and 3, and during operations with a potential for draining the reactor vessel (OPDRVs) to ensure that the control room personnel are protected during a LOCA. In MODES 4 and 5 at times other than OPDRVs, the probability of a vessel draindown event resulting in a release of radioactive material into the environment is minimal. In addition, adequate protection is performed by the Refueling Floor Radiation - High and Reactor Building Exhaust Radiation - High Functions. Therefore, this Function is not required in other MODES and specified conditions.

2. Drywell Pressure - High

High pressure in the drywell could indicate a break in the reactor coolant pressure boundary. A high drywell pressure signal could indicate a LOCA and will automatically initiate isolation of the control room emergency zone, since this could be a precursor to a potential radiation release and subsequent radiation exposure to control room personnel.

Drywell Pressure - High signals are initiated from four pressure switches that sense drywell pressure. Four channels of Drywell Pressure - High Function are available (two channels per trip system) and are required to be OPERABLE to ensure that no single instrument failure can

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2. Drywell Pressure—High (continued)

preclude control room emergency zone isolation. The Drywell Pressure—High Allowable Value was chosen to be the same as the RPS Drywell Pressure—High Allowable Value (LCO 3.3.1.1).

The Drywell Pressure—High Function is required to be OPERABLE in MODES 1, 2, and 3 to ensure that control room personnel are protected in the event of a LOCA. In MODES 4 and 5, the Drywell Pressure—High Function is not required since there is insufficient energy in the reactor to pressurize the drywell to the Drywell Pressure—High setpoint.

3. Main Steam Line Flow—High

High main steam line (MSL) flow could indicate a break in the MSL and will automatically initiate the isolation of the control room emergency zone, since this could be a precursor to a potential radiation release and subsequent radiation exposure to control room personnel.

The Main Steam Line Flow—High signals are initiated from 16 differential pressure switches that are connected to the four MSLs (the differential pressure switches sense differential pressure across a flow restrictor). Four channels of Main Steam Line Flow—High Function for each MSL (two channels per trip system) are available and required to be OPERABLE so that no single instrument failure will preclude control room emergency zone isolation.

The Allowable Value was chosen to be the same as the Primary Containment Isolation Main Steam Line Flow—High Allowable Value (LCO 3.3.6.1, "Primary Containment Isolation Instrumentation").

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.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

4, 5. Refueling Floor Radiation – High and Reactor Building Ventilation Exhaust Radiation – High

High radiation in the refueling floor area or in the reactor building ventilation exhaust could be 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 reactor cooling pressure boundary (RCPB) or the refuel floor due to a fuel handling accident. A refueling floor or a reactor building ventilation exhaust high radiation signal will automatically initiate isolation of the control room emergency zone, since this radiation release could result in radiation exposure to control room personnel.

The Refueling Floor Radiation – High signals are initiated from radiation detectors that are located to monitor the environment of the associated spent fuel pool. The Reactor Building Ventilation Exhaust Radiation–High signals are initiated from radiation detectors that are located on the ventilation exhaust duct coming from the associated reactor building. Therefore, the channels must be declared inoperable if the associated reactor building ventilation exhaust duct is isolated. Four channels of Refueling Floor Radiation – High Function and four channels of Reactor Building Ventilation Exhaust Radiation – High Function are available and are required to be OPERABLE to ensure that no single instrument failure will preclude control room emergency zone isolation.

The Allowable Values were selected to ensure that the Functions will promptly detect high activity that could threaten exposure to control room personnel.

The Refueling Floor Radiation – High Function and Reactor Building Ventilation Exhaust Radiation – High Function are 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 Functions are not required.

(continued)

ACTIONS

A Note has been provided to modify the ACTIONS related to CREV System 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 CREV System 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 CREV System isolation instrumentation channel.

A.1

Required Action A.1 directs entry into the appropriate Condition referenced in Table 3.3.7.1-1. The applicable Condition specified in the Table is Function dependent. Each time a channel is discovered inoperable, Condition A is entered for that channel and provides for transfer to the appropriate subsequent Condition.

B.1 and B.2

Because of the diversity of sensors available to provide isolation signals and the redundancy of the CREV System isolation instrumentation design, an allowable out of service time of 24 hours has been shown to be acceptable (Ref. 4) to permit restoration of any inoperable channel to OPERABLE status. However, this out of service time is only acceptable provided the associated Function is still maintaining CREV System isolation capability. A Function is considered to be maintaining CREV System isolation capability when sufficient channels are OPERABLE or in trip such that an initiation signal is generated from the given Function on a valid signal. For Function 3, this would require both trip systems to have one channel associated with each MSL, OPERABLE or in trip. For Functions 4 and

(continued)

ACTIONS

B.1 and B.2 (continued)

5, this would require each trip system to have one channel OPERABLE or in trip. In this situation (loss of CREV System isolation capability), the 24 hour allowance of Required Action B.2 is not appropriate. If the Function is not maintaining CREV System isolation capability, the CREV System must be declared inoperable within 1 hour of discovery of the loss of CREV System isolation capability (Required Action B.1). This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action B.1, the Completion time only begins upon discovery that the CREV System cannot be automatically isolated due to inoperable, untripped channels in the same Function in one trip system. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoring or tripping of channels. If it is not desired to declare the CREV System inoperable, Condition D may be entered and Required Action D.1 or D.2, as applicable, taken.

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 B.2. 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 D must be entered and its Required Action taken.

C.1 and C.2

Because of the diversity of sensors available to provide isolation signals and the redundancy of the CREV System instrumentation design, an allowable out of service time of 12 hours has been shown to be acceptable (Ref. 4) to permit restoration of any inoperable channel to OPERABLE status. However, this out of service time is only acceptable provided the associated Function is still maintaining CREV System isolation capability. A Function is considered to be

(continued)

ACTIONS

C.1 and C.2 (continued)

maintaining CREV System isolation capability when sufficient channels are OPERABLE or in trip such that both trip systems will generate an initiation signal from the given Function on a valid signal. For Functions 1 and 2, this would require both trip systems to have one channel OPERABLE or in trip. In this situation (loss of CREV System isolation capability), the 12 hour allowance of Required Action C.2 is not appropriate. If the Function is not maintaining CREV System isolation capability, the CREV System must be declared inoperable within 1 hour of discovery of the loss of CREV System isolation capability in both trip systems (Required Action C.1). This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." For Required Action C.1, the Completion Time only begins upon discovery that the CREV System cannot be automatically isolated due to inoperable, untripped channels in the same Function in one trip system. The 1 hour Completion Time is acceptable because it minimizes risk while allowing time for restoring or tripping of channels. If it is not desired to declare the CREV System inoperable, Condition D may be entered and Required Action D.1 or D.2, as applicable, taken.

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 C.2. Placing the inoperable channel in trip performs the intended function of the channel, conservatively compensates for the inoperability, restores capability to accommodate a single failure, and allows 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 D must be entered and its Required Action taken.

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

With any Required Action and associated Completion Time not met, each required control room penetration "flow path" must be isolated per Required Action D.1 to ensure that control room personnel will be protected in the event of a Design

(continued)

BASES

ACTIONS

D.1, D.2, and D.3 (continued)

Basis Accident. 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 CREV System isolation instrumentation. Alternately, if it is not desired to isolate each required control room penetration flow path or isolate the MSL, the CREV System must be declared inoperable within 1 hour.

The 1 hour Completion Time is intended to allow the operator time to isolate each required control room penetration flow path 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 isolating each required control room penetration flow path, for isolating the associated MSLs, or for entering the applicable Conditions and Required Actions for the inoperable CREV System.

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs for each CREV System isolation instrumentation Function are located in the SRs column of Table 3.3.7.1-1.

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 CREV System 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 (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 CREV System will isolate when necessary.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.7.1.1

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 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.

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 upon 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 channels required by the LCO.

SR 3.3.7.1.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. 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 analyses of Reference 4.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.7.1.3

The calibration of trip units provides a check of the actual trip setpoints. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in Table 3.3.7.1-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel 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 the setting accounted for in the appropriate setpoint methodology.

The Frequency of 92 days is based on the reliability analyses of Reference 4.

SR 3.3.7.1.4 and SR 3.3.7.1.5

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 92 day Frequency of SR 3.3.7.1.4 and the 24 month Frequency of SR 3.3.7.1.5 are based upon the assumption of a 92 day and 24 month calibration interval, respectively, in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.7.1.6

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.7.4, "Control Room Emergency Ventilation (CREV) System," overlaps this Surveillance to provide complete testing of the assumed safety function.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.7.1.6 (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 6.4.
2. UFSAR, Section 15.6.4.
3. UFSAR, Section 15.6.5.
4. GENE-770-06-1-A, "Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," December 1992.

B 3.3 INSTRUMENTATION

B 3.3.7.2 Mechanical Vacuum Pump Trip Instrumentation

BASES

BACKGROUND

The Mechanical Vacuum Pump Trip Instrumentation initiates a trip of the main condenser mechanical vacuum pump breaker following events in which main steam line radiation exceeds predetermined values. Tripping the mechanical vacuum pump limits the offsite and control room doses in the event of a control rod drop accident (CRDA).

The Mechanical Vacuum Pump Trip Instrumentation (Refs. 1 and 2) includes detectors, monitors, and relays that are necessary to cause initiation of a mechanical vacuum pump trip. 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 mechanical vacuum pump trip logic.

The trip logic consists of two independent 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 is needed to trip a trip system. The outputs of the channels in a trip system are combined in a one-out-of-two taken twice logic so that both trip systems must trip to result in a pump trip signal.

There is one isolation valve and two mechanical vacuum pump breakers associated with this Function.

APPLICABLE SAFETY ANALYSES

The Mechanical Vacuum Pump Trip Instrumentation is assumed in the safety analysis for the CRDA. The Mechanical Vacuum Pump Trip Instrumentation initiates a trip of the mechanical vacuum pump to limit offsite and control room doses resulting from fuel cladding failure in a CRDA (Ref. 3)

The mechanical vacuum pump trip instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

(continued)

BASES (continued)

LCO

The OPERABILITY of the mechanical vacuum pump trip is dependent on the OPERABILITY of the individual Main Steam Line 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 3.3.7.2.4. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions. Channel OPERABILITY also includes the mechanical vacuum pump breaker.

An Allowable Value is specified for the Main Steam Line Radiation — High Trip Function specified in the LCO. The nominal trip setpoint is specified in the setpoint calculations. The nominal setpoint is selected to ensure that the setpoint does 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. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. The trip setpoint is that predetermined value of output at which an action should take place. The setpoint is compared to the actual process parameter (i.e., main steam line radiation) and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., trip auxiliary unit) changes state. The analytic limit is derived from the limiting value of the process parameter obtained from the safety analysis. The trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

(continued)

BASES (continued)

APPLICABILITY

The mechanical vacuum pump trip is required to be OPERABLE in MODES 1 and 2, when any mechanical vacuum pump is in service (i.e., taking a suction on the main condenser) and any main steam line not isolated, to mitigate the consequences of a postulated CRDA. In this condition fission products released during a CRDA could be discharged directly to the environment. Therefore, the mechanical trip is necessary to assure conformance with the radiological evaluation of the CRDA. In MODE 3, 4 or 5 the consequences of a control rod drop are insignificant, and are not expected to result in any fuel damage or fission product releases. When the mechanical vacuum pump is not in service or the main steam lines are isolated, fission product releases via this pathway would not occur.

ACTIONS

A Note has been provided to modify the ACTIONS related to Mechanical Vacuum Pump Trip 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 Mechanical Vacuum Pump Trip 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 Mechanical Vacuum Pump Trip Instrumentation channel.

A.1 and A.2

With one or more channels inoperable, but with mechanical vacuum pump trip capability maintained (refer to Required Action B.1 Bases), the Mechanical Vacuum Pump Trip Instrumentation is capable of performing the intended function. However, the reliability and redundancy of the Mechanical Vacuum Pump Trip Instrumentation is reduced, such that a single failure in one of the remaining channels could

(continued)

BASES

ACTIONS

A.1 and A.2 (continued)

result in the inability of the Mechanical Vacuum Pump Trip Instrumentation to perform the intended function. Therefore, only a limited time is allowed to restore the inoperable channels to OPERABLE status. Because of the low probability of extensive numbers of inoperabilities affecting multiple channels, and the low probability of an event requiring the initiation of mechanical vacuum pump trip, 12 hours has been shown to be acceptable (Ref. 4) to permit restoration of any inoperable channel to OPERABLE status (Required Action A.1). Alternately, the inoperable channel, may be placed in trip (Required Action A.2), since this would conservatively compensate for the inoperability, restore capability to accommodate a single failure, and allow operation to continue. As noted, placing the channel in trip with no further restrictions is not allowed if the inoperable channel is the result of an inoperable mechanical vacuum pump breaker, since this may not adequately compensate for the inoperable breaker. 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 loss of condenser vacuum), or if the inoperable channel is the result of an inoperable breaker, Condition C must be entered and its Required Actions taken.

B.1

Condition B is intended to ensure that appropriate actions are taken if multiple, inoperable, untripped channels within the same trip system result in not maintaining mechanical vacuum pump trip capability. The mechanical vacuum pump trip capability is maintained when sufficient channels are OPERABLE or in trip such that the Mechanical Vacuum Pump Trip Instrumentation will generate a trip signal from a valid Main Steam Line Radiation - High signal, and the mechanical vacuum pump breaker will open. This would require both trip systems to have one channel OPERABLE or in trip, and the mechanical vacuum pump breaker to be OPERABLE.

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 time for restoration or tripping of channels.

(continued)

BASES

ACTIONS (continued)

C.1, C.2, C.3, and C.4

With any Required Action and associated Completion Time 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.4). Alternately, the associated mechanical vacuum pump may be removed from service since this performs the intended function of the instrumentation (Required Actions C.1 and C.2). An additional option is provided to isolate the main steam lines (Required Action C.3), 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 mechanical vacuum 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 mechanical vacuum pump trip capability is maintained. 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 mechanical vacuum pump will trip 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 3.3.7.2.1 (continued)

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.

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 upon 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 required channels of this LCO.

SR 3.3.7.2.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. 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 Reference 4.

SR 3.3.7.2.3 and SR 3.3.7.2.4

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

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.3.7.2.3 and SR 3.3.7.2.4 (continued)

range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology. A Note to SR 3.3.7.2.3 states that radiation detectors are excluded from CHANNEL CALIBRATION since they are calibrated in accordance with SR 3.3.7.2.4.

The Frequency of SR 3.3.7.2.3 is based upon the assumption of a 92 day calibration interval in the determination of the magnitude of equipment drift associated with the channel, except for the radiation detectors, in the setpoint analysis. The Frequency of SR 3.3.7.2.4 is based upon the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift for the radiation detector in the setpoint analysis.

SR 3.3.7.2.5

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required trip logic for a specific channel. The system functional test of the mechanical vacuum pump breakers and isolation valve 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 or the isolation valve 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.

(continued)

BASES (continued)

REFERENCES

1. UFSAR, Section 7.3.2.2.2.
2. UFSAR, Section 11.5.2.6.
3. UFSAR, Section 15.4.10.
4. NEDC-30851-P-A, "Supplement 2, "Technical Specifications Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," March 1989.

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 4160 V Essential Service System (ESS) buses. Offsite power is the preferred source of power for the 4160 V ESS buses. If the monitors determine that insufficient voltage is available, the buses are disconnected from the offsite power sources and connected to the onsite diesel generator (DG) power sources.

Each 4160 V ESS 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 Degraded Voltage.

Each Division 1 and 2 4160 V ESS Bus Loss of Voltage and Degraded Voltage Function is monitored by two undervoltage relays for each ESS bus, whose outputs are arranged in a two-out-of-two logic configuration (Ref. 1). When, on decreasing voltage, the 4160 V ESS Bus Undervoltage (Loss of Voltage) Function setpoint has been exceeded on both relay channels, the Loss of Voltage Function sends a LOP signal to the respective bus load shedding scheme and starts the associated DG. For the Degraded Voltage Function, one Bus Undervoltage/Time Delay Function (two channels) and one Time Delay Function (one channel) are included. The Time Delay Function associated with the Bus Undervoltage relay is inherent to the Bus Undervoltage - Degraded Voltage relay and is nominally adjusted to seven seconds to prevent circuit initiation caused by grid disturbances and motor starting transients. The Bus Undervoltage/Time Delay Function provides input to the Time Delay Function. The Time Delay Function relay is nominally adjusted to five minutes to allow time for the operator to attempt to restore normal bus voltage. When a Bus Undervoltage/Time Delay Function setpoint has been exceeded and persists for seven

(continued)

BASES

BACKGROUND (continued)

seconds on both relay channels, a control room annunciator alerts the operator of the degraded voltage condition and the five minute Time Delay Function timer is initiated. If the degraded voltage condition does not clear within five minutes, the five minute Time Delay Function relay sends a LOP signal to the respective bus load shedding scheme and starts the associated DG. If a degraded voltage condition exists coincident with an ECCS actuation signal, the five minute Time Delay Function is bypassed such that load shedding and the associated DG start will be initiated following the seven second time delay (Bus Undervoltage/Time Delay Function).

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.

Accident analyses credit the loading of the DGs based on the loss of offsite power coincident with a loss of coolant accident (LOCA). The diesel starting and loading times have been included in the delay time associated with each safety system component requiring DG supplied power following a loss of offsite power.

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

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 4160 V ESS bus, with their setpoints within the specified Allowable Values. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions.

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The Allowable Values are specified for each Function 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 the 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 (e.g., degraded voltage), and when the measured output value of the process parameter exceeds the setpoint, the associated device changes state. The analytic limits are derived from the limiting values of the process parameters obtained from the safety analysis. The trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

1. 4160 V ESS Bus Undervoltage (Loss of Voltage)

Loss of voltage on a 4160 V ESS bus indicates that offsite power may be completely lost to the respective 4160 V ESS 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 to DG power prior to the voltage on the bus dropping below the

(continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1. 4160 V ESS Bus Undervoltage (Loss of Voltage) (continued)

minimum Loss of Voltage Function Allowable Value but after the voltage drops below the maximum Loss of Voltage Function Allowable Value (loss of voltage). This ensures that adequate power will be available to the required equipment.

The Bus Undervoltage Allowable Values are low enough to prevent inadvertent power supply transfer, but high enough to ensure that power is available to the required equipment.

Two channels of 4160 V ESS Bus Undervoltage (Loss of Voltage) Function per associated emergency bus are required to be OPERABLE when the associated DG is required to be OPERABLE to ensure that no single instrument failure can preclude the bus undervoltage function. Refer to LCO 3.8.1, "AC Sources - Operating," and 3.8.2, "AC Sources - Shutdown," for Applicability Bases for the DGs.

2. 4160 V ESS Bus Undervoltage (Degraded Voltage)

A reduced voltage condition on a 4160 V ESS bus indicates that, while offsite 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. Therefore, power supply to the bus is transferred from offsite power to onsite DG power when the voltage on the bus drops below the Degraded Voltage Function Allowable Value, however the transfer does not occur until after the inherent and No LOCA time delays have elapsed, as applicable. If a LOCA condition exists coincident with a loss of power to the bus, the Time Delay (No LOCA) Function is bypassed. This ensures that adequate power will be available to the required equipment.

The Bus Undervoltage Allowable Values are low enough to prevent inadvertent power supply transfer, but high enough to ensure that sufficient power is available to the required equipment. The Time Delay Allowable Values are long enough to provide time for the offsite power supply to recover or

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2. 4160 V ESS Bus Undervoltage (Degraded Voltage) (continued)

allow restoration to normal voltages, but short enough to ensure that sufficient power is available to the required equipment.

Two channels of 4160 V ESS Bus Undervoltage/Time Delay (Degraded Voltage) Function and one channel of Degraded Voltage-Time Delay Function per associated bus are required to be OPERABLE when the associated DG is required to be OPERABLE to ensure that no single instrument failure can preclude the degraded voltage and time delay function. Refer to LCO 3.8.1 and LCO 3.8.2 for Applicability Bases for the DGs.

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 tripped condition per Required Action A.1. Placing the inoperable channel in trip would conservatively compensate

(continued)

BASES

ACTIONS

A.1 (continued)

for the inoperability, restore capability to accommodate a single failure (within the LOP instrumentation), 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 channel in trip would result in a DG initiation), Condition B must be entered and its Required Action taken.

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.

B.1

If any Required Action and associated Completion Time are not met, the associated Function is not capable of performing the intended function. Therefore, the associated DG(s) is declared inoperable immediately. This requires entry into applicable Conditions and Required Actions of LCO 3.8.1 and LCO 3.8.2, which provide appropriate actions for the inoperable DG(s).

SURVEILLANCE REQUIREMENTS

As noted at the beginning of the SRs, the SRs for each LOP instrumentation Function are located in the SRs column of Table 3.3.8.1-1.

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 2 hours provided the associated Function maintains LOP initiation capability. LOP initiation capability is maintained provided the bus load shedding scheme and the associated DG can be initiated by the Loss of Voltage or Degraded Voltage Functions for one of the two 4160 V ESS buses. Upon completion of the Surveillance, or expiration of the 2 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition entered and Required Actions taken.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.8.1.1

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 24 months is based on operating experience with regard to channel OPERABILITY and drift, which demonstrates that failure of more than one channel of a given Function in any 24 month interval is a rare event.

SR 3.3.8.1.2

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 Frequency is based upon the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.8.1.3

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required actuation logic for a specific channel. The system functional testing performed in LCO 3.8.1 and LCO 3.8.2 overlaps this Surveillance to provide complete testing of the assumed safety 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 these components usually pass the Surveillance when performed at the 24 month Frequency.

(continued)

BASES (continued)

REFERENCES	1.	UFSAR, Section 8.3.1.8.
	2.	UFSAR, Section 5.2.
	3.	UFSAR, Section 6.3.
	4.	UFSAR, Chapter 15.

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 and scram pilot valve solenoids.

The 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 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)

BACKGROUND (continued)

circuit breakers has an associated independent set of Class 1E overvoltage, undervoltage, and underfrequency sensing logic. Together, a circuit breaker and its sensing logic constitute an electric power monitoring assembly. If the output of the inservice MG set or alternate power supply exceeds predetermined limits of overvoltage, undervoltage, or underfrequency, a trip coil (undervoltage release coil) within the circuit breaker driven by this logic circuitry opens the circuit breaker, which removes the associated power supply from service.

APPLICABLE SAFETY ANALYSES

The RPS Electric Power Monitoring is necessary to meet the assumptions of the safety analyses by ensuring that the equipment powered from the RPS buses can perform its intended function. RPS Electric Power Monitoring provides protection to the RPS and other systems that receive power from the RPS buses, by acting to disconnect the RPS from the power supply under specified conditions that could damage the RPS bus powered equipment.

RPS Electric Power Monitoring satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The OPERABILITY of each RPS electric power monitoring assembly is dependent on the OPERABILITY of the overvoltage, undervoltage, and underfrequency logic, as well as the OPERABILITY of the associated circuit breaker. Two electric power monitoring assemblies are required to be OPERABLE for each inservice power supply. This provides redundant protection against any abnormal voltage or frequency conditions to ensure that no single RPS electric power monitoring assembly failure can preclude the function of RPS bus powered components. Each of the inservice electric power monitoring assembly trip logic setpoints is required to be within the specified Allowable Value. The actual setpoint is calibrated consistent with applicable setpoint methodology assumptions.

Allowable Values are specified for each RPS electric power monitoring assembly trip logic (refer to SR 3.3.8.2.2). Nominal trip setpoints are specified in the setpoint

(continued)

BASES

LCO (continued)

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. 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 (e.g., overvoltage), and when the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., trip coil) changes state. The analytic limits are derived from the limiting values of the process parameters obtained from the safety analysis. The trip setpoints are determined from the analytic limits, corrected for defined process, calibration, and instrument errors. The Allowable Values are then determined, based on the trip setpoint values, by accounting for the calibration based errors. These calibration based errors are limited to reference accuracy, instrument drift, errors associated with measurement and test equipment, and calibration tolerance of loop components. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrument 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 and appropriately applied for the instrumentation.

The Allowable Values for the instrument settings are based on RPS component testing with the RPS providing 56 Hz ± 1%, 126.5 V ± 2.5%, and 108.0 V ± 2.5%. The most limiting voltage requirement and associated line losses determine the settings of the electric power monitoring instrument channels. The settings are calculated based on the loads on the buses and RPS MG set or alternate power supply being 120 VAC and 60 Hz.

APPLICABILITY

The operation of the RPS electric power monitoring assemblies is essential to disconnect the RPS bus powered components from the inservice MG set or alternate power supply during abnormal voltage or frequency conditions. Since the degradation of a nonclass 1E source supplying

(continued)

BASES

APPLICABILITY (continued)

power to the RPS bus can occur as a result of any random single failure, the OPERABILITY of the RPS electric power monitoring assemblies is required when the RPS bus powered components are required to be OPERABLE. This results in the RPS Electric Power Monitoring System OPERABILITY being required in MODES 1 and 2; and in MODE 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies.

ACTIONS

A.1

If one RPS electric power monitoring assembly for an inservice power supply (MG set or alternate) is inoperable, or one RPS electric power monitoring assembly on each inservice power supply is inoperable, the OPERABLE assembly will still provide protection to the RPS bus powered components under degraded voltage or frequency conditions. However, the reliability and redundancy of the RPS Electric Power Monitoring System is reduced, and only a limited time (72 hours) is allowed to restore the inoperable assembly to OPERABLE status. If the inoperable assembly cannot be restored to OPERABLE status, the associated power supply(s) must be removed from service (Required Action A.1). This places the RPS bus in a safe condition. An alternate power supply with OPERABLE power monitoring assemblies may then be used to power the RPS bus.

The 72 hour Completion Time takes into account the remaining OPERABLE electric power monitoring assembly and the low probability of an event requiring RPS electric power monitoring protection occurring during this period. It allows time for plant operations personnel to take corrective actions or to place the plant in the required condition in an orderly manner and without challenging plant systems.

Alternately, if it is not desired to remove the power supply from service (e.g., as in the case where removing the power supply(s) from service would result in a scram), Condition C or D, as applicable, must be entered and its Required Actions taken.

(continued)

ACTIONS
(continued)

B.1

If both power monitoring assemblies for an inservice power supply (MG set or alternate) are inoperable or both power monitoring assemblies in each inservice power supply are inoperable, the system protective function is lost. In this condition, 1 hour is allowed to restore one assembly to OPERABLE status for each inservice power supply. If one inoperable assembly for each inservice power supply cannot be restored to OPERABLE status, the associated power supply(s) must be removed from service within 1 hour (Required Action B.1). An alternate power supply with OPERABLE assemblies may then be used to power one RPS bus. The 1 hour Completion Time is sufficient for the plant operations personnel to take corrective actions and is acceptable because it minimizes risk while allowing time for restoration or removal from service of the electric power monitoring assemblies.

Alternately, if it is not desired to remove the power supply(s) from service (e.g., as in the case where removing the power supply(s) from service would result in a scram), Condition C or D, as applicable, must be entered and its Required Actions taken.

C.1

If any Required Action and associated Completion Time of Condition A or B are not met in MODE 1 or 2, a plant shutdown must be performed. This places the plant in a condition where minimal equipment, powered through the inoperable RPS electric power monitoring assembly(s), is required and ensures that the safety function of the RPS (e.g., scram of control rods) is not required. The plant shutdown is accomplished by placing the plant in MODE 3 within 12 hours. The allowed Completion Time is reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES

ACTIONS (continued)

D.1

If any Required Action and associated Completion Time of Condition A or B are not met in MODE 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies, the operator must immediately initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies. Required Action D.1 results in the least reactive condition for the reactor core and ensures that the safety function of the RPS (e.g., scram of control rods) is not required.

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 channel will perform the intended function. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

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. 2).

SR 3.3.8.2.2

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 adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.8.2.2 (continued)

The Frequency is based on the assumption of a 24 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. The system functional test shall include actuation of the protective relays, tripping logic, and output circuit breakers. 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 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 7.2.2.
2. NRC Generic Letter 91-09, "Modification of Surveillance Interval for the Electrical Protective Assemblies in Power Supplies for the Reactor Protection System."

A.1

3.1 - LIMITING CONDITIONS FOR OPERATION

A. Reactor Protection System (RPS)

LCO 3.3.1.1 The reactor protection system (RPS) instrumentation CHANNEL(s) shown in Table 3.1.A-1 shall be OPERABLE. A.2

APPLICABILITY: add proposed ACTIONS NOTE 1

As shown in Table 3.1.A-1.

A.3 Insert CTS 3.1.A Actions

ACTION:

1. ~~With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement for one TRIP SYSTEM, place the inoperable CHANNEL(s) and/or that TRIP SYSTEM in the tripped condition[a] within 1 hour.~~

2. ~~With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement for both TRIP SYSTEM(s), place at least one TRIP SYSTEM in the tripped condition[b] within 1 hour and take the ACTION required by Table 3.1.A-1.~~

4.1 - SURVEILLANCE REQUIREMENTS

A. Reactor Protection System

Note 1 to Surveillance Requirements

1. Each reactor protection system instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL MODE(s) and at the frequencies shown in Table 4.1.A-1.

SR 3.3.1.1.17

2. LOGIC SYSTEM FUNCTIONAL TEST(s) of all CHANNEL(s) shall be performed at least once per 18 months. 24 LD.1

SR 3.3.1.1.18

3. The response time of each reactor trip functional unit shown in Table 3.1.A-1 shall be demonstrated at least once per 24 18 months. LD.1 ~~Each test shall include at least one CHANNEL per TRIP SYSTEM such that all CHANNEL(s) are tested at least once every N times 18 months where N is the total number of redundant CHANNEL(s) in a specific reactor TRIP SYSTEM.~~ L.10

addressed by Definition of Staggered Test BASIS, Note 2 and A.7

add proposed Note 1 to SR 3.3.1.1.18 L.1

Insert CTS 3.1.A Notes (a) and (b) A.3

---

a ~~An inoperable CHANNEL need not be placed in the tripped condition when this would cause the trip function to occur. In these cases, the inoperable CHANNEL shall be restored to OPERABLE status within 2 hours or the ACTION required by Table 3.1.A-1 for that trip function shall be taken.~~

b ~~The TRIP SYSTEM need not be placed in the tripped condition if this would cause the trip function to occur. When a TRIP SYSTEM can be placed in the tripped condition without causing the trip function to occur, place the TRIP SYSTEM with the most inoperable CHANNEL(s) in the tripped condition; if both systems have the same number of inoperable CHANNEL(s), place either TRIP SYSTEM in the tripped condition.~~

A.1

ITS 3.3.1.1

A.3 Insert CTS 3.1.A Actions

Insert 1, ~~Page 3/4.1-1~~

1. With one CHANNEL required by Table 3.1.A-1 inoperable ~~for Functional Units 1 through 12~~ ~~in one or more Functional Units~~ place the inoperable CHANNEL and/or that TRIP SYSTEM in the tripped condition[(a)] within 12 hours. A.4 A.2 ACTION A

2. With two or more CHANNELS required by Table 3.1.A-1 inoperable ~~for Functional Units 1 through 12~~ in one or more Functional Units: A.4 ACTIONS A, B and C

   a. Within one hour, verify sufficient CHANNELS remain OPERABLE or tripped[(a)] to maintain trip capability in the Functional Unit, and ACTION C

   b. Within 6 hours, place the inoperable CHANNEL(s) in one TRIP SYSTEM and/or that TRIP SYSTEM[(b)] in the tripped condition[(a)], and ACTION B

   c. Within 12 hours, restore the inoperable CHANNELS in the other TRIP SYSTEM to an OPERABLE status or tripped[(a)]. ACTION A

ACTION D Otherwise, take the ACTION required by Table 3.1.A-1 for the Functional Unit.

3. With one or more CHANNEL(s) required by Table 3.1.A-1 inoperable for ~~Functional Units 13 or 14~~, within one hour place the inoperable CHANNEL(s) in the tripped condition[(a)]. A.4 ACTION C

ACTION D Otherwise, take the ACTION required by Table 3.1.A-1 for the Functional Unit.

A.1

ITS 3.3.1.1

A.3

Insert CTS 3.1.A Notes a and b

~~Insert 2, Page~~ 3/4.1-1

LA.1

a. ~~An inoperable CHANNEL or TRIP SYSTEM need not be placed in the tripped condition where this would cause the trip function to occur.~~ In these cases, if the inoperable

ACTION D CHANNEL is not restored to OPERABLE status within the required time, the ACTION required by Table 3.1.A-1 for the Functional Unit shall be taken.

b. ~~This ACTION applies to that TRIP SYSTEM with the most inoperable CHANNELS; if both TRIP SYSTEMS have the same number of inoperable CHANNELS, the ACTION can be applied to either TRIP SYSTEM.~~ LA.1

Table 3.3.1.1-1

TABLE 3.1.A-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION

Note 2 to Surveillance Requirements

Function Functional Unit	Applicable OPERATIONAL MODE(s)	Minimum OPERABLE CHANNEL(s) per TRIP SYSTEMⓐ	ACTION
1. 1. Intermediate Range Monitor:			
1.a a. Neutron Flux - High	2 ~~3, 4~~ 5 (a)	3 ~~2~~ 3	G 11 ~~12~~ L.2 H 13
1.b b. Inoperative	2 ~~3, 4~~ 5 (a)	3 ~~2~~ 3	G 11 ~~12~~ L.2 H 13
2. 2. Average Power Range Monitorⓑ: LA.2			
2.a a. Setdown Neutron Flux - High	2 ~~3~~ 5(c)	2 ~~2~~ 2	G 11 ~~12~~ L.2 13 A.5 Moved to ITS 3.10.7
2.b b. Flow Biased Neutron Flux - High	1	2	F 14
2.c c. Fixed Neutron Flux - High	1	2	F 14
2.d d. Inoperative	1, 2 ~~3~~ 5(c)	2 ~~2~~ 2	G 11 ~~12~~ L.2 13 A.5 moved to ITS 3.10.7
3. 3. Reactor Vessel Steam Dome Pressure - High	1, 2ⓓ A.6	2	G 11
4. 4. Reactor Vessel Water Level - Low	1, 2	2	G 11

L.3

Add proposed Note (a) to Table 3.3.1.1-1

3.3.1.1-1

TABLE ~~3.1.A-1~~ (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

Note 2 to Surveillance Requirements

Function Functional Unit	Applicable OPERATIONAL MODE(s)	Minimum OPERABLE CHANNEL(s) per TRIP SYSTEM(a)	ACTION
5. 5. Main Steam Line Isolation Valve - Closure	1	~~4~~ 8 A.7	F 14
~~6. Main Steam Line Radiation - High~~	~~1, 2(f)~~	~~2~~	~~15~~ A.8
6. 7. Drywell Pressure - High	1, 2(h) A.6	2	G 11
7. 8. Scram Discharge Volume Water Level - High			
b. a. ΔP Switch, and	1, 2 5(b,i)	2 2	G 11 H 13
a. b. Thermal Switch	1, 2 5(b,i)	2 2	G 11 H 13
8. 9. Turbine Stop Valve - Closure	~~1(d)~~ ≥45% RTP	4	E 16
~~10. Deleted~~			
9. 11. Turbine Control Valve Fast Closure	~~1(d)~~ ≥45% RTP	2	E 16
10. 12. Turbine Condenser Vacuum - Low	1	2	F 14

A.9

Note (a) L.4

A.1

ITS 3.3.1.1

Page 5 of 16

ITS 3.3.1.1

A.1

3.3.1.1-1

TABLE ~~3.1.A-1~~ (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

Note 2 to Surveillance Requirements

add proposed Note (a) to Table 3.3.1.1-1

Function Functional Unit	Applicable OPERATIONAL MODE(s)	Minimum OPERABLE CHANNEL(s) per TRIP SYSTEM(a)	ACTION
11 13. Reactor Mode Switch Shutdown Position L.3	1, 2	1	G 11
	~~3, 4~~	~~1~~	~~17~~ L.2
	5	1	H 13
12 14. Manual Scram	1, 2	1	F 11
	~~3, 4~~	~~1~~	~~18~~ L.2
	5	1	H 19

A.1

ITS 3.3.1.1

3.3.1.1-1

TABLE [illegible] (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

ACTION

G **ACTION 11 -** Be in at least HOT SHUTDOWN within 12 hours.

L.2 A.11 L.3 L.4

ACTION 12 - Verify all insertable control rods to be fully inserted ~~in the core and lock the~~ reactor mode switch in the Shutdown position within one hour.

Initiate action to

H **ACTION 13 -** Suspend all operations involving CORE ALTERATIONS ~~and~~ fully insert all insertable control rods ~~within one hour~~. If SRM instrumentation is not OPERABLE ~~per Specification 3.10.B, also suspend~~ replacement of LPRMs.

A.11 immediately

L.5

F **ACTION 14 -** Be in at least STARTUP within 8 hours.

A.8

ACTION 15 - Be in STARTUP with the main steam line isolation valves closed within 8 hours or in at least HOT SHUTDOWN within 12 hours.

L.6 L.9

E **ACTION 16 -** Initiate a reduction in THERMAL POWER within 15 minutes and reduce reactor power to less than 45% of RATED THERMAL POWER within ~~2~~ 4 hours.

L.2

ACTION 17 - Verify all insertable control rods to be fully inserted in the core within one hour.

L.2

ACTION 18 - Lock the reactor mode switch in the Shutdown position within one hour.

Initiate action to

A.11

H **ACTION 19 -** Suspend all operations involving CORE ALTERATIONS, ~~and~~ fully insert all insertable control rods ~~and lock the reactor mode switch in the Shutdown position within one hour~~. If SRM instrumentation is not OPERABLE per Specification 3.10.B, also suspend replacement of LPRMs.

L.3 L.4 L.3 L.5

A.11 immediately

Page 7 of 16

A.1

ITS 3.3.1.1

A.3

3.3.1.1-1

TABLE ~~3.1.A-1~~ (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

TABLE NOTATION

Insert CTS Table 3.1.A-1 Note a

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

~~(b) This function may be bypassed, provided a control rod block is actuated, for reactor protection system logic reset in Refuel and Shutdown positions of the reactor mode switch.~~ L.4

~~(c) Deleted~~ Function 8,9 Applicability

(d) With THERMAL POWER greater than or equal to 45% of RATED THERMAL POWER. LA.2

~~(e) An APRM CHANNEL is inoperable if there are fewer than 2 LPRM inputs per level or there are less than 50% of the normal complement of LPRM inputs to an APRM CHANNEL.~~

~~(f) This function is not required to be OPERABLE when the reactor pressure vessel head is unbolted or removed per Specification 3.12.A.~~ A.6

(g) Required to be OPERABLE only prior to and during required SHUTDOWN MARGIN demonstrations performed per Specification 3.12.B. A.5 moved to ITS 3.10.7

~~(h) This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required.~~ A.6

(i) With any control rod withdrawn. ~~Not applicable to control rods removed per Specification 3.10.I or 3.10.J~~ A.9

Table 3.3.1.1-1 footnote (a)

from a core cell containing one or more fuel assemblies L.4

A.1

ITS 3.3.1.1

A.3

Insert as Table 3.1.A-1 Note a

Insert ~~3, Page 3/4.1-6~~

(a) When a CHANNEL is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required ACTIONs may be delayed for up to 6 hours provided the Functional Unit maintains RPS trip capability.

Note 2
to Surveillance
Requirements

A.1

ITS 3.3.1.1

Page 10 of 16

3.3.1.1-1

TABLE ~~4.1.A-1~~

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Note 1 to SR 3.3.1.1.14 SR 3.3.1.1.16

SR 3.3.1.1.4 SR 3.3.1.1.10

SR 3.3.1.1.2 SR 3.3.1.1.3 SR 3.3.1.1.11 SR 3.3.1.1.12 SR 3.3.1.1.14 SR 3.3.1.1.16

SR 3.3.1.1.5 A.3

L.3 add proposed Note (a) to Table 3.3.1.1-1

	Functional Unit	Applicable OPERATIONAL MODES	SR 3.3.1.1.1 CHANNEL CHECK	CHANNEL FUNCTIONAL TEST(r)	CHANNEL CALIBRATION(d)
1.	1. Intermediate Range Monitor:				
1.a	a. Neutron Flux - High	2 ~~3, 4~~, 5	S(b) -1 (SR 3.3.1.1.6, SR 3.3.1.1.7) S -1	A.12 ~~S/U(c)~~, W(a) -4 W(a) -4	16 - ~~E~~(a) 16 - ~~E~~(a)
1.b	b. Inoperative	2, ~~3, 4~~, 5	NA	W(a) -4	NA
2.	2. Average Power Range Monitor(f): (SR 3.3.1.1.4)				
2.a	a. Setdown Neutron Flux - High	2 ~~3~~, ~~5(m)~~	S(b) -1 (SR 3.3.1.1.7) ~~S~~	A.12 ~~S/U(c)~~, W(a) -4 ~~W(a)~~	14-SA(a) ~~SA(a)~~
2.b	b. Flow Biased Neutron Flux - High	1	1 S, ~~D~~ A.13	~~W~~ -10	2) 3) W(d,e), SA -14
2.c	c. Fixed Neutron Flux - High	1	1 - S	~~W~~ -10	2) - W(d), SA -14
2.d	d. Inoperative	1, 2, ~~3~~, ~~5(m)~~	NA	~~W~~ -10	NA
3.	3. Reactor Vessel Steam Dome Pressure - High	1, 2~~(h)~~ A.6	A.3 S ~~D~~~~(k)~~ -1 A.16	(g) A.16 ~~M~~ -10	16 - E A.3 ~~Q~~(i)(j) -11 A.16
4.	4. Reactor Vessel Water Level - Low	1, 2	M.2 12 hours ~~D~~ -1	~~M~~ -10	16 - ~~E~~(i) -11
5.	5. Main Steam Line Isolation Valve - Closure	1	NA	~~M~~ -10	16 - ~~E~~
	~~6. Main Steam Line Radiation - High~~	~~1, 2(l)~~	~~S~~	~~M~~	~~E(p)~~
6.	7. Drywell Pressure - High	1, 2(n) A.6	NA	A.3 Q ~~M~~ -10	Q-12

L.2

A.5 moved to ITS 3.10.7

A.5 moved to ITS 3.10.7

L.8 add proposed SR 3.3.1.1.16 for flow portion of channel and Note 3 to SR 3.3.1.1.14

A.3 Q

LE.1 24 months

A.3 Q

A.8

3.3.1.1-1

TABLE 4.1.A-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Note 1 to
SR 3.3.1.1.14
SR 3.3.1.1.16

SR 3.3.1.1.8
SR 3.3.1.1.10
SR 3.3.1.1.15

SR 3.3.1.1.12
SR 3.3.1.1.16

SR 3.3.1.1.5

A.3

LE.1

24 months

Functional Unit	Applicable OPERATIONAL MODES	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST(r)	CHANNEL CALIBRATION(a)
7. 8. Scram Discharge Volume Water Level - High				
7.b a. ΔP Switch, and	1, 2, 5(1.k)	NA	Q-10	E-16
7.a b. Thermal Switch	1, 2, 5(1.k)	NA	Q-10	NA
8. 9. Turbine Stop Valve - Closure	1(l) ≥45% RTP	NA	Q M -10	E -16
10. Deleted				
9. 11. Turbine Control Valve Fast Closure	1(l)	NA	Q M -10	E -16
10. 12. Turbine Condenser Vacuum - Low	1	NA	M -10	Q-12
11. 13. Reactor Mode Switch Shutdown Position	1, 2, 3/4, 5	NA	E -15	NA
12. 14. Manual Scram	1, 2, 3/4, 5	NA	M-8	NA

L.4

Note (a)

M.1

add proposed SR 3.3.1.1.12

M.3

add proposed SR 3.3.1.1.13

A.3

A.3

LE.1

24 months

L.2

L.2

24 months

LD.2

L.3

add proposed Note (a) to Table 3.3.1.1-1

REACTOR PROTECTION SYSTEM

A.1

ITS 3.3.1.1

REACTOR PROTECTION SYSTEM

3.3.1.1-1

TABLE 4.1.A-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATION

Note 1 SR 3.3.1.1.14 SR 3.3.1.1.16 (a) Neutron detectors may be excluded from the CHANNEL CALIBRATION.

LA.3

SR 3.3.1.1.6 (b) The IRM and SRM channels shall be determined to overlap for at least (½) decades during each startup after entering OPERATIONAL MODE 2 ~~and the IRM and APRM channels shall be~~
SR 3.3.1.1.7 determined to overlap for at least (½) decades during each controlled shutdown, if not performed within the previous 7 days.

LA.3 A.12

SR 3.3.1.1.4 (c) Within 24 hours prior to startup, if not performed within the previous 7 days. The weekly CHANNEL FUNCTIONAL TEST may be used to fulfill this requirement.

SR 3.3.1.1.2 (d) This calibration shall consist of the adjustment of the APRM CHANNEL to conform, within 2% of RATED THERMAL POWER, to the power values calculated by a heat balance during OPERATIONAL MODE 1 when THERMAL POWER is ≥25% of RATED THERMAL POWER. This adjustment must be accomplished: a) within 2 hours if the APRM CHANNEL is indicating lower power values than the heat balance, or b) within 12 hours if the APRM CHANNEL is indicating higher power values than the heat balance. Until any required APRM adjustment has been accomplished, notification shall be posted on the reactor control panel.

ACTIONS Note 2

L.11 L.7

SR 3.3.1.1.2 Note Any APRM CHANNEL gain adjustment made in compliance with Specification 3.11.B shall not be included in determining the above difference. This calibration is not required when THERMAL POWER is <25% of RATED THERMAL POWER. The provisions of Specification 4.0.D are not applicable.

Not required to be performed until 12 hours after THERMAL POWER ≥ 25% RTP

SR 3.3.1.1.3 (e) This calibration shall consist of the adjustment of the APRM flow biased channel to conform to a calibrated flow signal.

SR 3.3.1.1.9 (f) The LPRMs shall be calibrated at least once per 2000 effective full power hours (EFPH).

~~(g) Deleted.~~

92 A.3

SR 3.3.1.1.11 SR 3.3.1.1.16 (h) Trip units are calibrated at least once per 31 days and transmitters are calibrated at the frequency identified in the table.

A.6 L.4

(i) This function is not required to be OPERABLE when the reactor pressure vessel head is unbolted or removed per Specification 3.12.A.

from a core cell containing one or more fuel assemblies

Table 3.3.1.1-1 footnote (a) (j) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.10.1 or 3.10.4.

A.9

(k) This function may be bypassed, provided a control rod block is actuated, for reactor protection system reset in Refuel and Shutdown positions of the reactor mode switch.

L.4

A.1

ITS 3.3.1.1

3.3.1.1-1

TABLE ~~4.1.A-1~~ (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Functions 8 and 9 Applicability (l) With THERMAL POWER greater than or equal to 45% of RATED THERMAL POWER.

(m) Required to be OPERABLE only prior to and during required SHUTDOWN MARGIN demonstrations performed per Specification 3.12.B. A.5 moved to ITS 3.10.7

(n) ~~This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required.~~ A.6

SR 3.3.1.1.4 SR 3.3.1.1.14 SR 3.3.1.1.16 (o) The provisions of Specification 4.0.D are not applicable to the CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION surveillances for a period of 24 hours after entering OPERATIONAL MODE 2 or 3 when shutting down from OPERATIONAL MODE 1.

(p) ~~A current source provides an instrument channel alignment every 3 months.~~ A.8

(q) ~~The CHANNEL CHECK frequency will remain NA and the CHANNEL CALIBRATION frequency will remain Q for Functional Unit 3 until instrument upgrades are completed (Design Change Package Nos. 9900090 for Unit 1 and 9900091 for Unit 2).~~ A.16

SR 3.3.1.1.5 (r) A Functional Test of each automatic Scram contactor will be performed on a surveillance frequency of W. A.3

Page 13 of 16

A.1

ITS 3.3.1.1

2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

2.2 LIMITING SAFETY SYSTEM SETTINGS

A.14

Reactor Protection System (RPS) Instrumentation Setpoints

LCO 3.3.1.1 2.2.A The reactor protection system instrumentation setpoints shall be set consistent with the Trip Setpoint values shown in Table 2.2.A-1.

A.14

Allowable Value A.10

APPLICABILITY: As shown in Table 3.1.A-1.

ACTION:

A.14

ACTION A-H

With a reactor protection system instrumentation setpoint less conservative than the value shown in the Trip Setpoint column of Table 2.2.A-1, declare the CHANNEL inoperable and apply the applicable ACTION statement requirement of Specification 3.1.A until the CHANNEL is restored to OPERABLE status with its setpoint adjusted consistent with the Trip Setpoint value.

Allowable Value

A.10

ITS 3.3.1.1

A.1

TABLE 2.2.A-1 3.3.1.1-1

REACTOR PROTECTION SYSTEM INSTRUMENTATION SETPOINTS

LF.1 A.10

	Function Functional Unit	Trip Setpoint Allowable Values
1.	1. Intermediate Range Monitor:	
1.a	a. Neutron Flux - High	≤120/125 divisions of full scale
1.b	b. Inoperative	NA
	2. Average Power Range Monitor:	
2.a	a. Setdown Neutron Flux - High	≤15% of RATED THERMAL POWER
2.b	b. Flow Biased Neutron Flux - High	
	1) Dual Recirculation Loop Operation	LA.4
	a) Flow Biased	≤0.58W[a] + 62%, with a maximum of
	b) High Flow Clamped	≤120% of RATED THERMAL POWER
2.b	2) Single Recirculation Loop Operation	LA.4
	a) Flow Biased	≤0.58W[a] + 58.5%, with a maximum of
	b) High Flow Clamped	≤116.5% of RATED THERMAL POWER
2.c	c. Fixed Neutron Flux - High	≤120% of RATED THERMAL POWER
2.d	d. Inoperative	NA
3	3. Reactor Vessel Steam Dome Pressure - High	≤1060 psig LA.5
4	4. Reactor Vessel Water Level - Low	≥144 inches above top of active fuel
5	5. Main Steam Line Isolation Valve - Closure	≤10% closed
	6. Main Steam Line Radiation - High	≤15 x normal full power background (without hydrogen addition) A.8

LA.4

---

[a] W shall be the recirculation loop flow expressed as a percentage of the recirculation loop flow which produces a rated core flow of 98 million lbs/hr.

TABLE ~~2.2.A-1~~ 3.3.1.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION ~~SETPOINTS~~

Functional Unit	~~Trip Setpoint~~ Allowable Value A.10	
6. 7. Drywell Pressure - High	≤2.5 psig	LF.1
7. 8. Scram Discharge Volume Water Level - High:	≤40 gallons	
8. 9. Turbine Stop Valve - Closure	≤10% closed	
~~10. Deleted~~		LF.1
9. 11. Turbine Control Valve Fast Closure	≥460 psig EHC fluid pressure	
10. 12. Turbine Condenser Vacuum - Low	≥21 inches Hg vacuum	
11. 13. Reactor Mode Switch Shutdown Position	NA	
12. 14. Manual Scram	NA	

ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 This proposed change to the CTS 3.1.A Actions provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3, "Completion Times," the ITS 3.3.1.1 ACTIONS Note ("Separate Condition entry is allowed for each....") and the wording for ACTION A ("One or more required channels") and ACTIONS B and C ("One or more Functions") provide direction consistent with the intent of the existing Actions for an inoperable RPS instrumentation channel. It is intended that each inoperable channel is allowed a certain time to complete the Required Actions. Since this change only provides more explicit direction of the current interpretation of the existing specifications, this change is considered administrative.

A.3 These changes to CTS 3/4.1.A are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 27, 1999. The changes identified are consistent with the allowances in NEDO-30851-P-A, "Technical Specification Improvement Analysis for BWR Protection System," dated March 1988. As such, this change is administrative.

A.4 The explicit reference to Functional Units 1 through 12 in CTS 3.1.A Actions 1 and 2 have been deleted in proposed ITS 3.3.1.1 ACTIONS A and B. This is acceptable since each of these Functional Units are automatically actuated when the parameter exceeds the associated trip setpoint and since each of these Functions include four redundant channels and the loss of one channel in each trip system does not result in a loss of function. In addition, the explicit reference in CTS 3.1.A Action 3 to Functional Units 13 or 14 have been deleted. These Functional Units are the Reactor Mode Switch Shutdown Position and Manual Scram, respectively. Since these Functions do not include four redundant channels ITS 3.3.1.1 ACTIONS A and B are not applicable and entry into proposed ITS 3.3.1.1 ACTION C (RPS trip capability not maintained) is required when any of the associated channels are found to be inoperable. This is

ADMINISTRATIVE

A.4 (cont'd) required since, with any manual channel inoperable, trip capability is not maintained. Since these changes simply reflect a presentation preference this change is considered administrative. The Bases clearly identifies these requirements.

A.5 CTS Table 3.1.A-1 footnote (g) and CTS Table 4.1.A-1 footnote (m), which require the APRM Functional Units 2.a and 2.d to be Operable during shutdown margin demonstrations performed per Specification 3.12.B, have been moved to ITS 3.10.7 in accordance with the BWR ISTS, NUREG-1433, Rev. 1. Any technical changes to these requirements will be discussed in the Discussion of Changes for ITS: 3.10.7.

A.6 CTS Table 3.1.A-1 Note (f) and CTS Table 4.1.A-1 Note (i) state that the Reactor Vessel Steam Dome Pressure — High Function (Functional Unit 3) is not required to be OPERABLE in MODE 2 when the reactor vessel head is removed per CTS 3.12.A. CTS Table 3.1.A-1 Note (h) and CTS Table 4.1.A-1 Note (n) state that the Drywell Pressure — High Function (Functional Unit 7) is not required to be OPERABLE in MODE 2 when PRIMARY CONTAINMENT INTEGRITY is not required in MODE 2 (i.e., when Special Test Exception 3/4.12.A is being used). These notes are deleted from CTS Tables 3.1.A-1 and 4.1.A-1 since the only applicable condition in which these notes would be needed has been deleted (see Discussion of Changes for CTS: 3/4.12.A, in Section 3.10). Therefore, Notes (f) and (h) of CTS Table 3.1.A-1 and Notes (i) and (n) of CTS Table 4.1.A-1 are no longer required and the change is considered administrative.

A.7 All MSIV channels are required to be OPERABLE to assure a scram with the worst case single failure. The MSIV Closure Function (CTS Table 3.1.A-1 Functional Unit 5) requires a minimum of 4 channels per trip system. There is one position switch and two associated contacts per valve. Each of the eight MSIVs inputs its closure signal to each RPS trip system (trip system A and B). Currently, two inputs from separate MSIVs (i.e., contacts) are combined into a single "channel." To ensure the interpretation that all MSIV position switches are required to each trip system, each MSIV contact is viewed as a separate channel (a total of 16 channels). Therefore, the minimum number of channels is more appropriately specified as "8" in Function 5 of ITS Table 3.3.1.1-1. Since these changes involve no design change but are only differences of nomenclature, these changes are considered administrative.

ADMINISTRATIVE (continued)

A.8 These changes to CTS 3/4.1.A and 2.2.A are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 30, 1999. The changes identified are consistent with the allowances in NEDO-31400A to remove the RPS scram and main steam line isolation as a result of a main steam line high radiation signal. As such, this change is considered administrative.

A.9 The proposed Applicability of ITS 3.3.1.1 Functions 7.a and 7.b requires the Functions to be OPERABLE in MODE 5 only with any control rod withdrawn from a core cell containing one or more fuel assemblies. This Applicability is consistent with CTS Table 3.1.A-1 Note (i) and Table 4.1.A-1 Note (j) as modified by Discussion of Change L.4 below, but clarified by removing the cross references to the Special Operations LCOs. This change is a presentation preference and does not alter the current Applicability requirements. Therefore, this change is considered administrative in nature.

A.10 CTS 2.2.A requires the reactor protection system instrumentation setpoints to be set consistent with the Trip Setpoint values shown in Table 2.2.A-1. The CTS 2.2.A Action requires the CHANNEL to be declared inoperable when the setpoint is less conservative than the value shown in the Trip Setpoint column of Table 2.2.A-1. Table 2.2.A-1 includes a "Trip Setpoint" column. It is proposed to re-label this column as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1, (ISTS Table 3.3.1.1-1). In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS Table 2.2.A-1 are applied as the Operability limits for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual trip setpoints specified in CTS Table 2.2.A-1 for the RPS Functions or the Allowable Values specified in ITS Table 3.3.1.1-1 (see Discussion of Change LF.1 below for proposed changes to the trip setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

A.11 The existing action in CTS Table 3.1.A-1 Actions 13 and 19 to "insert...within 1 hour" (see Discussion of Changes L.3 and L.4 below for a change to what gets inserted) is proposed to be revised to "initiate action to insert...Immediately." The existing requirement appears to provide an hour in which control rods could be left withdrawn, even if able to be inserted. If the control rod is incapable of being inserted in 1 hour, the existing action would appear to result in the requirement for an LER. The intent of the Action is more appropriately presented in ITS 3.3.1.1 Required Action H.1. With the proposed Required

ADMINISTRATIVE

A.11 (cont'd) Action, a significantly more conservative requirement to insert the control rod(s) and maintain insertion is imposed. No longer would the provision to withdraw or leave withdrawn one or more control rods for up to 1 hour exist. However, with this conservatism comes the understanding that if best efforts to insert the control rod(s) exceeds 1 hour, no LER will be required.

This interpretation of the Actions intent is supported by the BWR ISTS, NUREG-1433, Rev. 1. Because this is an enhanced presentation of the existing intent, the proposed change is considered administrative.

A.12 The CHANNEL FUNCTIONAL TEST Surveillance Frequency of "S/U" and Note (c) of CTS Table 4.1.A-1 for Functions 1.a and 2.a, "within 24 hours before startup, if not performed within the previous 7 days," is redundant to the requirements of proposed SR 3.0.4, which requires the periodic weekly Surveillance to be performed and current prior to entry into the applicable operational conditions. Once the applicable conditions are entered, the periodic weekly Surveillance Frequency provides adequate assurance of OPERABILITY, if required. Therefore, the removal of this Frequency is considered administrative. This is consistent with the current wording of the Note (c) of CTS Table 4.1.A-1 (the weekly CHANNEL FUNCTIONAL TEST may be used to fulfill this requirement).

A.13 The CHANNEL CHECK associated with CTS Table 4.1.A-1 Function 2.b (proposed ITS Table 3.3.1.1-1 Function 2.b) is every 12 hours (S) and every 24 hours (D). Since both Frequencies are not necessary, the daily (D) Frequency has been deleted and the proposed Frequency is every 12 hours. Since this change will not increase or decrease the number of times the Surveillance must be performed this change is considered administrative. The proposed Frequency is consistent with BWR ISTS, NUREG-1433, Rev. 1, and the current requirements for other instrumentation within the CTS.

A.14 In ITS 3.3.1.1, "RPS Instrumentation," the CTS 2.2 Limiting Safety System Settings (Setpoints) Table 2.2.A-1 has been combined with the current RPS Technical Specification (CTS 3.1.A). The information in CTS Table 2.2.A-1 is located in ITS Table 3.3.1.1-1. Changes made to the information are described in comments below. Since this change involves no design change but is only a difference of nomenclature and presentation preference, this change is considered administrative.

ADMINISTRATIVE (continued)

A.15 Not used.

A.16 The requirements in CTS Table 4.1.A-1 Footnote (q) have been deleted since the instrument upgrades, referenced in the footnote, in both Units 1 and 2 have been completed. As such, this change is administrative.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS Table 4.1.A-1 requires a 92 day CHANNEL FUNCTIONAL TEST of Functional Unit 8.b, Scram Discharge Volume Water Level - High (Thermal Switch). The Table does not require a CHANNEL CALIBRATION. A new Surveillance has been added (SR 3.3.1.1.12) to this Functional Unit to ensure the associated channels are calibrated properly. This CHANNEL CALIBRATION must be performed at a 24 month Frequency. This new SR represents an additional restriction on plant operation.

M.2 The Frequency of the CHANNEL CHECK requirement of CTS Table 4.1.A-1 Function 4, Reactor Vessel Water Level - Low, has been increased from every 24 hours to 12 hours. This change to the CTS constitutes a more restrictive change to help ensure this Function is maintained OPERABLE. This change is consistent with BWR ISTS, NUREG-1433, Rev. 1, and the current requirements for other instrumentation within the CTS.

M.3 A Surveillance has been added (proposed SR 3.3.1.1.13) to verify the automatic enabling of the Turbine Stop Valve—Closure and Turbine Control Valve Fast Closure, Control Oil Pressure—Low Functions at $\geq$ 45% RTP. This SR ensures that the associated RPS scram Functions are not inadvertently bypassed with power $\geq$ 45% RTP. This new SR represents an additional restriction on plant operation.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The details in CTS 3.1.A Action footnotes a and b, relating to placing channels in trip, are proposed to be relocated to the Bases. The ACTIONS of ITS 3.3.1.1 ensure inoperable channels are placed in trip or the unit is placed in a non-applicable MODE or condition, as appropriate. As a result, these relocated details are not necessary for ensuring the appropriate actions are taken in the event of inoperable RPS channels. As such, these relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LA.2 The LPRM inputs for OPERABILITY of the APRM (CTS Table 3.1.A-1 Note (e)) are proposed to be relocated to the Bases. The Bases states that if sufficient LPRMs are not available (the same number as in CTS Table 3.1.A-1, Note (e)), then the associated APRM is inoperable. The Bases requires at least 50% of the LPRM inputs to each required APRM consistent with the current requirement that an inoperable APRM channel is one that has less than 50% of the normal complement of LPRM inputs. In addition, the Bases requires at least two LPRM inputs from each of the four axial levels. As such, these details are not necessary in the RPS Instrumentation Table 3.3.1.1-1. The definition of OPERABILITY suffices. Therefore, the relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LA.3 Details of the methods for performing CTS 4.1.A.1, the IRM and APRM CHANNEL CHECK (CTS Table 4.1.A-1 Note (b), for at least 1/2 decade) is proposed to be relocated to the Bases. These details are not necessary to ensure the OPERABILITY of the RPS Instrumentation. The requirements of ITS 3.3.1.1 and the associated Surveillance Requirements are adequate to ensure the RPS instrumentation are maintained OPERABLE. Specifically, SRs 3.3.1.1.6 and 3.3.1.1.7 continue to require SRM/IRM and IRM/APRM overlap to be verified. As such, these relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

LA.4 CTS Table 2.2.A-1 Note (a) states that the APRM Flow-Biased Neutron Flux—High scram value varies as a function of recirculation loop drive flow (W). This detail of system description is proposed to be relocated to the Bases. ITS 3.3.1.1 and associated SRs will ensure that the Allowable Value is maintained properly. This detail is not necessary to ensure the Allowable Value is maintained properly. As such, this relocated detail is not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LA.5 The detail in CTS Table 2.2.A-1 that the Reactor Vessel Water Level—Low Function setting (Functional Unit 4) is referenced to a level above the top of active fuel is proposed to be relocated to the UFSAR. This detail is not necessary to ensure the OPERABILITY of this RPS Function. The requirements of ITS 3.3.1.1, including the proposed Surveillance Requirements, are adequate to ensure the RPS Function remains OPERABLE. Therefore, the relocated detail is not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the UFSAR will be controlled by the provisions of 10 CFR 50.59.

LD.1 The Frequencies for performing the RPS LOGIC SYSTEM FUNCTIONAL TEST (LSFT) of CTS 4.1.A.2 (proposed SR 3.3.1.1.17) and the RPS RESPONSE TIME TEST of CTS 4.1.A.3 (proposed SR 3.3.1.1.18) have been extended from 18 months to 24 months. These SRs ensure that RPS logic will function as designed in response to an analyzed event. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that these tests normally pass their Surveillances at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. Extending the Surveillance Test interval for the RPS LSFT and RESPONSE TIME TEST is acceptable because the RPS is verified to be operating properly throughout the operating cycle by the performance of

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LD.1 (cont'd) CHANNEL FUNCTIONAL TESTS and, in some cases, CHANNEL CHECKS. This testing ensures that a significant portion of the RPS circuitry is operating properly and will detect significant failures of this circuitry. Additional justification for extending the Surveillance Test interval is that the RPS network, including the actuating logic, is designed to be single failure proof and therefore, is highly reliable. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LD.2 The Frequency for performing the CTS 4.1.A.1 CHANNEL FUNCTIONAL TEST for CTS Table 4.1.A-1 Functional Unit 13, Reactor Mode Switch—Shutdown Position Function (proposed SR 3.3.1.1.15) has been extended from 18 months to 24 months. The Reactor Mode Switch Shutdown Position provides manual trip capability of the Reactor Protection System that is redundant to the automatic protective instrumentation channels and to the Manual Scram pushbuttons. The proposed change will allow this Surveillance to extend its Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace

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LD.2 (cont'd) period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that this test normally passes its Surveillance at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. Extending the Surveillance Test interval for the Reactor Mode Switch— Shutdown Position is acceptable due to the system redundancy and because the RPS System is verified to be operating properly throughout the operating cycle by the performance of CHANNEL CHECKS and CHANNEL FUNCTIONAL TESTS on the other trip functions. This testing ensures that a significant portion of the RPS circuitry is operating properly and will detect significant failures of this circuitry. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequency, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) does not invalidate any assumptions in the plant licensing basis.

LE.1 The Frequency for performing the CTS 4.1.A CHANNEL CALIBRATION for CTS Table 4.1.A-1 Functional Units 1.a, 3, 4, 5, 8.a, 9, and 11 (proposed SR 3.3.1.1.16 for Functions 1.a, 3, 4, 5, 7.b, 8, and 9) has been extended from 18 months to 24. The proposed change will allow these Surveillances to extend

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LE.1 (cont'd) their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. The subject SR ensures that the RPS System will function as designed during an analyzed event. Extending the SR Frequency is acceptable because the RPS system along with the RPS initiation logic is designed to be single failure proof and therefore is highly reliable. Furthermore, the impacted RPS instrumentation has been evaluated based on make, manufacturer and model number to determine that the instrumentation's actual drift falls within the design allowance in the associated setpoint calculation. The following paragraphs, listed by CTS Functional Unit number, identify by make, manufacturer and model number the drift evaluations performed:

Functional Unit 1.a, Intermediate Range Monitor (IRM) Neutron Flux—High

This function is performed by a fission chamber, voltage preamplifier, and a mean square voltage-wide range monitor. The equipment is supplied by General Electric. It is required to be OPERABLE in MODES 2 and 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies to minimize the consequences of a control rod withdrawal error. During these modes of operation other surveillances are performed more frequently which will detect major deviation in the system. The equipment drift was evaluated utilizing a qualitative analysis. The results of this analysis support 24 month fuel cycle surveillance interval extension.

Functional Unit 3, Reactor Vessel Steam Dome Pressure—High

This function is performed by Rosemount 1153GD9 Transmitters and Rosemount 510DU/710DU Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount Transmitters were recently installed in the plant and a sufficient quantity of As Found and As Left calibration data was not available to perform a rigorous drift analysis. The vendors drift specification will be used to calculate a 30 month drift. The

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LE.1 (cont'd) calculated 30 month drift will be used in the development of the plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 4, Reactor Vessel Water Level—Low

This function is performed by Rosemount 1153DB4PA Transmitters and Rosemount 510DU/710DU Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 5, Main Steam Isolation Valve—Closure

This function is performed by NAMCO 180-21302 limit switches. Limit switches are mechanical devices that require mechanical adjustment only; drift is not applicable to these devices. Therefore, an increase in surveillance interval to accommodate a 24 month fuel cycle does not affect limit switches with respect to drift.

Functional Unit 8.a, Scram Discharge Volume Water Level—High, Differential Pressure Switch

This function is performed by Barton Model 764 differential pressure transmitters and Rochester switches. The Rochester switches are functionally checked more frequently. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rochester switches with respect to drift. The Barton Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd)

Functional Unit 9, Turbine Stop Valve—Closure

This function is performed by NAMCO EA700-90964 limit switches. Limit switches are mechanical devices that require mechanical adjustment only; drift is not applicable to these devices. Therefore, an increase in surveillance interval to accommodate a 24 month fuel cycle does not affect limit switches with respect to drift.

Functional Unit 11, Turbine Control Valve Fast Closure

This function is performed by Barksdale Pressure Switches TC9622-3 and TC9612-2. The Barksdale Pressure Switches (TC9622-3) drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis. The Barksdale Pressure Switches (TC9612-2) were recently installed in the plant and a sufficient quantity of As Found and As Left calibration data was not available to perform a rigorous drift analysis. The vendors drift specification will be used to calculate a 30 month drift. The calculated 30 month drift will be used in the development of the plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Based on the design of the instrumentation and the drift evaluations, it is concluded that the impact, if any, on system availability is minimal as a result of the change in the surveillance test interval. A review of the surveillance test history was performed to validate the above conclusion. This review of the surveillance test history, demonstrates that there are no failures that would invalidate the conclusion that the impact, if any on system availability is minimal from a change to a 24 month surveillance frequency. In addition, the proposed 24 month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint

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LF.1 (cont'd) Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

"Specific"

L.1 CTS Table 4.1.A-1 Note (a) excludes neutron detectors from the CHANNEL CALIBRATION of the IRM and APRM instrumentation channels. This allowance has been incorporated as a Note in proposed ITS SR 3.3.1.1.14 (for APRMs) and proposed ITS SR 3.3.1.1.16 (for IRMs). This is allowed since the neutron detectors are passive devices, with minimal drift, because of the difficulty of simulating a meaningful signal, and since neutron detector sensitivity is compensated for by performing the 7 day calorimetic calibration (SR 3.3.1.1.2) and the LPRM calibration in SR 3.3.1.1.9. This allowance is also required for RPS RESPONSE TIME TESTING due to the difficulties of simulating a meaningful signal. This allowance is also acceptable because the principles of detector operation virtually ensure an instantaneous response time. Therefore, a Note (NOTE 1) has been added to CTS 4.1.A.3 (the RPS RESPONSE TIME test) as shown in proposed ITS SR 3.3.1.1.18. This change is consistent with BWR ISTS, NUREG-1433, Rev. 1.

L.2 During normal operation in MODES 3 and 4, all control rods are fully inserted and the Reactor Mode Switch Shutdown position control rod withdrawal block (ITS 3.3.2.1) does not allow any control rod to be withdrawn. Under these conditions, the RPS function is not required to be OPERABLE; therefore the IRM, APRM, Reactor Mode Switch Shutdown Position, and Manual Scram requirements for MODES 3 and 4 (CTS Tables 3.1.A-1 and 4.1.A-1 Functional Units 1, 2.a (MODE 3 only), 2.d (MODE 3 only) 13, and 14) have been deleted. The Actions associated with these Functions for MODES 3 and 4 are also deleted (CTS Table 3.1.A-1 Actions 12, 17, and 18). Special Operations LCO 3.10.2 and LCO 3.10.3 will allow a single control rod to be withdrawn in MODES 3 or 4 by allowing the Reactor Mode Switch to be in the Refuel position. Therefore, the IRM, Reactor Mode Switch Position, and Manual Scram MODES 3 and 4 RPS requirements have been included in LCO 3.10.2 and LCO 3.10.3. The APRM requirements have not been included in ITS 3.10.2 and 3.10.3 since only one rod is allowed to be withdrawn and therefore the neutron flux levels are low.

L.3 CTS Tables 3.1.A-1 and 4.1.A-1 require Functional Units 1.a, 1.b, 13, and 14 (IRM Neutron Flux—High, IRM Inoperative, Reactor Mode Switch—Shutdown Position, and Manual Scram) to be OPERABLE in MODE 5. ITS 3.3.1.1 only requires these Functions to be OPERABLE in MODE 5 when a control rod is withdrawn from a core cell containing one or more fuel assemblies (ITS Table 3.3.1.1-1 Note (a)). Control rods withdrawn from or inserted into a core cell containing no fuel assemblies have a negligible impact on the reactivity of

TECHNICAL CHANGES - LESS RESTRICTIVE

L.3 (cont'd) the core and therefore are not required to be OPERABLE with the capability to scram. Provided all rods otherwise remain inserted, the RPS Functions serve no purpose and are not required. In this condition the required SHUTDOWN MARGIN (ITS 3.1.1) and the required one-rod-out interlock (ITS 3.9.2) ensure no event requiring RPS will occur. This change is also similar to the allowance provided in CTS Table 3.1.A-1 Note (i) and CTS Table 4.1.A-1 Note (j) for Functional Units 8.a and 8.b (Refer to Discussion of Change L.4 below for further discussion). In addition, CTS Table 3.1.A-1 Actions 13 and 19, as they apply to Functional Units 1.a, 1.b, 13, and 14, have also been modified in ITS 3.3.1.1 ACTION H to be consistent with the new Applicability. Currently, Core Alterations are required to be suspended and all insertable control rods must be inserted. Since all control rods are required to be fully inserted during fuel movement (enforced by ITS 3.9.1), the proposed Applicability cannot be entered while moving fuel. Thus, the only possible Core Alteration is control rod withdrawal, which is adequately addressed in ITS 3.3.1.1 ACTION H. When control rods are withdrawn in MODE 5 in accordance with Special Operations LCOs (ITS Section 3.10), the requirements of the ITS 3.10 LCOs provide sufficient controls to ensure the possibility of an inadvertent criticality is precluded. Furthermore, CTS Table 3.1.A-1 Action 19 also requires the reactor mode switch to be locked in Shutdown. This Action has also been deleted since the proposed Applicability only requires the control rods to be inserted (i.e., once the control rods are inserted, the RPS Functions are no longer required to be OPERABLE, thus there is no need to place the reactor mode switch in Shutdown). This is consistent with the BWR ISTS, NUREG-1433, Rev. 1.

L.4 The Applicability of CTS Table 3.1.A-1 Functional Units 8.a and 8.b, including Notes (b) and (i), and Table 4.1.A-1 Functional Units 8.a and 8.b, including Notes (j) and (k), has been modified to only require ITS Table 3.3.1.1-1 RPS Functions 7.a and 7.b to be OPERABLE in MODE 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies. In addition, ITS 3.3.1.1 ACTION H for MODE 5 only requires action to be initiated to fully insert control rods in core cells containing one or more fuel assemblies. Control rods withdrawn from or inserted into a core cell containing no fuel assemblies have a negligible impact on the reactivity of the core and therefore are not required to be OPERABLE with the capability to scram. Provided all rods otherwise remain inserted, the RPS Functions serve no purpose and are not required. In this condition the required SHUTDOWN MARGIN (ITS 3.1.1) and the required one-rod-out interlock (ITS 3.9.2) ensure no event requiring RPS will occur. The Action for these inoperable Functions in MODE 5 (CTS Table 3.1.A-1 Action 13) is also revised to be consistent with the proposed

TECHNICAL CHANGES - LESS RESTRICTIVE

L.4 ((cont'd) Applicability. Currently, Core Alterations are required to be suspended and all insertable control rods must be inserted. Since all control rods are required to be fully inserted during fuel movement (enforced by ITS 3.9.1), the proposed Applicability cannot be entered while moving fuel. The only possible Core Alteration is control rod withdrawal, which is adequately addressed by ITS 3.3.1.1 ACTION H. When control rods are withdrawn in MODE 5 in accordance with Special Operations LCOs (ITS Section 3.10), the requirements of the ITS 3.10 LCOs provide sufficient controls to ensure the possibility of an inadvertent criticality is precluded.

L.5 The requirement in CTS Table 3.1.A-1 Action 13 and 19 requiring the suspension of LPRM replacement if SRM instrumentation is not OPERABLE per CTS 3.10.B has been deleted since the proposed Required Actions are adequate to minimize the reactivity of the core whenever required Functions are inoperable (IRMs, APRMs, Scram Discharge Volume Water Level, Reactor Mode Switch Shutdown Position, or Manual Scram) concurrent with SRM inoperabilities. In MODE 5 with one or more required SRMs inoperable, ITS 3.3.1.2 Required Action E.1 will require the immediate suspension of CORE ALTERATIONS except for control rod insertion and Required Action E.2 will require the immediate initiation of action to fully insert all insertable control rods in core cells containing one or more fuel assemblies. For RPS Functions inoperable in MODE 5, ITS 3.3.1.1 Required Action H.1 will require the initiation of action to fully insert all insertable control rods in core cells containing one or more fuel assemblies. As discussed in Discussion of Change A.5 the OPERABILITY requirements of Functions 2.a and 2.d (APRMs) have been moved to ITS 3.10.7 since CTS Table 3.1.A.1 Note (g) only requires Function 2.a and 2.d to be OPERABLE during the SHUTDOWN MARGIN demonstrations performed per CTS 3.12.B (proposed ITS 3.10.7). However, ITS 3.10.7 will not allow any other CORE ALTERATIONS (i.e., loading fuel) during entry into 3.10.7 and Required Action B.1 will require the immediate placement of the reactor mode switch to the shutdown or refuel position whenever the APRM Functions are inoperable. These proposed requirements are adequate to minimize the reactivity of the core whenever SRM or other RPS Functions are inoperable in MODE 5. The current requirements impose restrictions (repair the SRMs prior to repairing the LPRMs) that are not necessary. Since the proposed Specifications adequately reduce the core reactivity when necessary, this change is acceptable.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.6 The CTS Table 3.1.A-1 Action 16 requirement to initiate a reduction in THERMAL POWER within 15 minutes has been deleted. Immediate power reduction may not always be the conservative method to assure safety. ITS 3.3.1.1 Required Action E.1, which requires the unit to be < 45% RTP within 4 hours (see Discussion of Change L.9 below), ensures prompt action is taken to exit the Applicability due to the inoperability of the associated RPS Functions.

L.7 CTS Table 4.1.A-1 Note (d) requires that the APRM channels conform to within 2% of the power values calculated by a heat balance at THERMAL POWER ≥ 25% of RTP. The Surveillance is not required to be performed when THERMAL POWER is less than 25% of RTP and the provisions of CTS 4.0.D are applicable. This adjustment must be accomplished within 2 hours if the APRM CHANNEL is indicating lower power values than the heat balance or within 12 hours if the APRM channel is indicating high power values than the heat balance. These requirements have been modified and are being incorporated as a Note to the APRM heat balance calibration (CTS Table 4.1.A-1 Note (d), proposed SR 3.3.1.1.2) that states the Surveillance is not required to be performed until 12 hours after THERMAL POWER ≥ 25% RTP. The explicit exclusion to 4.0.D is not necessary since these requirements are included in ITS 3.0.4. The requirement to calibrate within 2 and 12 hours depending on the status of the APRMS has been included in proposed Note 2 to ITS 3.3.1.1 ACTIONS. The proposed time of 12 hours after THERMAL POWER is ≥ 25% RTP is allowed because it is difficult to accurately determine core THERMAL POWER from a heat balance < 25% RTP. The 12 hours provides sufficient time to perform the Surveillance after THERMAL POWER ≥ 25%. This is acceptable since at these low power levels, there is adequate margin to thermal limits (MCPR, APLGHR, LHGR).

L.8 CTS Table 4.1.A-1 requires a CHANNEL CALIBRATION to be performed at a 184 day Frequency for Functional Unit 2.b, APRM Flow Biased Neutron Flux—High. This Frequency has been extended to 24 months for the reactor recirculation flow portion of these channels (SR 3.3.1.1.16). The proposed Frequency provides an adequate level of protection and is acceptable since other Surveillances performed during the cycle will help to ensure the channel remains OPERABLE. The remainder of the APRM Flow Biased Neutron Flux—High Function channels will be calibrated in accordance with proposed SR 3.3.1.1.14 at a 184 day Frequency. Note 3 has been added to this Surveillance (SR 3.3.1.1.14) which excludes the flow portion of the channels for Function 2.b.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.9 The time to reach < 45% RTP has been extended from 2 hours (CTS Table 3.1.A-1 Action 16) to 4 hours (ITS 3.3.1.1 Required Action E.1). This extension provides the necessary time to decrease power in a controlled and orderly manner that is within the capabilities of the unit, assuming the minimum required equipment is OPERABLE. This extra time is an acceptable exchange in risk; the risk of an event during the additional period for the unit to be < 45% RTP, versus the potential risk of a unit upset that could challenge safety systems resulting from a rapid power reduction. This time is consistent with the time provided in the BWR ISTS, NUREG-1433, Rev. 1.

L.10 CTS 4.1.A.3 requires the demonstration of the response time for "each" RPS functional unit in Table 3.1.A-1. The response time for some of the RPS Functions (i.e., Manual Scram, Reactor Mode Switch, IRMs, APRM Neutron Flux Setdown, and Scram Discharge Volume Water Level) are not assumed in any accident analysis, and therefore the proposed RPS RESPONSE TIME test (ITS SR 3.3.1.1.18) is only associated with those Functions that are credited in the accident analysis where an explicit RPS RESPONSE TIME is assumed. This change is acceptable since the OPERABILITY of the remaining channels will still be confirmed during the LOGIC SYSTEM FUNCTIONAL TEST, CHANNEL FUNCTIONAL TEST or the CHANNEL CALIBRATION surveillances, as applicable. This change is consistent with BWR ISTS, NUREG-1433, Revision 1.

L.11 The requirement in CTS Table 4.1.A-1 Footnote (d) to post a notification on the reactor control panel if any required APRM must be adjusted to be within 2% of RATED THERMAL POWER has been deleted. The Quad Cities 1 and 2 Operating Licenses limit the operation of each unit to 2511 megawatts thermal, which is 100% RATED THERMAL POWER (RTP). In addition, the posting of the adjustment in the control room is not necessary to be described in the Technical Specifications. This requirement is essentially an "operator aid" to remind the operators that an adjustment must be made. This requirement is not necessary in the Technical Specifications to ensure power is maintained within the limit allowed by the Operating License. Operators are required by 10 CFR 55 to comply with the Operating License. Therefore, this requirement has been deleted from Technical Specifications.

RELOCATED SPECIFICATIONS

None

3.2 - LIMITING CONDITIONS FOR OPERATION

LCO 3.3.1.2 **G. Source Range Monitoring**

At least the following source range monitor (SRM) channels shall be OPERABLE:

Table 3.3.1.2-1

a. In OPERATIONAL MODE 2[a], three.

b. In OPERATIONAL MODE 3 and 4, two.

APPLICABILITY:

OPERATIONAL MODE(s) 2[a], 3, and 4.

ACTION:

L.1 — or more

ACTION A — 1. In OPERATIONAL MODE 2[a] with one or more of the above required source range monitor CHANNEL(s) inoperable, at least 3 source range monitor CHANNEL(s) shall be restored to OPERABLE status within 4 hours or

ACTION C — the reactor shall be in at least HOT SHUTDOWN within the next 12 hours.

ACTION D — 2. In OPERATIONAL MODE(s) 3 or 4 with one or more of the above required source range monitor CHANNEL(s) inoperable, verify all insertable control rods to be fully inserted in the core and ~~lock~~ the reactor mode switch in the Shutdown position within one hour.

A.2

place — L.2

Add proposed ACTION B — L.1

4.2 - SURVEILLANCE REQUIREMENTS

A.3

G. Source Range Monitoring — Add proposed Note to Surveillance Requirements

Each of the required source range monitor CHANNEL(s) shall be demonstrated OPERABLE by:

M.1

SR 3.3.1.2.4 1. Verifying, ~~prior to withdrawal of the control rods,~~ that the SRM count rate is ≥3 cps ~~with the detector fully inserted.~~ — LA.1

L.8 — or ≥ 0.7 cps with a signal to noise ratio ≥ 20:1

2. Performance of a CHANNEL CHECK at least once per:

SR 3.3.1.2.1 a. 12 hours in OPERATIONAL MODE 2[a], and

SR 3.3.1.2.3 b. 24 hours in OPERATIONAL MODE(s) 3 or 4.

3. Performance of a CHANNEL FUNCTIONAL TEST:

M.5 — and determination of signal to noise ratio

~~a. Within 7 days prior to startup, and~~ — L.3

SR 3.3.1.2.6 b. At least once per 31 days[b].

SR 3.3.1.2.7 4. Performance of a CHANNEL CALIBRATION[c] at least once per ~~18~~ 24 months[b]. — LE.1

Table 3.3.1.2-1 Note a — a With IRM's on range 2 or below.

SR 3.3.1.2.6 Note, SR 3.3.1.2.7 Note 2 — b The provisions of Specification 4.0.D are not applicable for entry into the applicable OPERATIONAL MODE(s) from OPERATIONAL MODE 1, provided the surveillance is performed within 12 hours after such entry.

SR 3.3.1.2.7 Note 1 — c Neutron detectors may be excluded from the CHANNEL CALIBRATION.

ITS 3.3.1.2

A.1

3.10 - LIMITING CONDITIONS FOR OPERATION

LCO 3.3.1.2 and Table 3.3.1.2-1

B. Instrumentation

At least 2 source range monitor[a] (SRM) CHANNEL(s) shall be OPERABLE ~~and inserted to the normal operating level with:~~

~~1. Continuous visual indication in the control room, and~~

LA.2

SR 3.3.1.2.2 b and c

2. One of the required SRM detectors located in the quadrant where CORE ALTERATION(s) are being performed and the other required SRM detector located in an adjacent quadrant.

M.3 Add proposed SR 3.3.1.2.2.a and Note 2

APPLICABILITY:

OPERATIONAL MODE 5~~, unless the following conditions are met:~~

SR 3.3.1.2.4 Note

~~1. No more than two fuel assemblies are present in each core quadrant associated with an SRM;~~

M.2

M.5 and determination of signal to noise ratio

Add proposed SR 3.3.1.2.4 Note

L.4

L.8 or ≥ 0.7cps with a signal to noise ratio ≥ 20:1

4.10 - SURVEILLANCE REQUIREMENTS

B. Instrumentation

Each of the required SRM channels shall be demonstrated OPERABLE by:

1. At least once per 12 hours:

SR 3.3.1.2.1 a. Performance of a CHANNEL CHECK.

LA.2

~~b. Verifying the detectors are inserted to the normal operating level, and~~

SR 3.3.1.2.2 b and c Note 1

c. During CORE ALTERATION(s), verifying that the detector of an OPERABLE SRM CHANNEL is located in the core quadrant where CORE ALTERATION(s) are being performed and another is located in an adjacent quadrant.

SR 3.3.1.2.5

2. Performance of a CHANNEL FUNCTIONAL TEST:

L.3

~~a. Within 24 hours prior to the start of CORE ALTERATION(s), and~~

b. At least once per 7 days.

SR 3.3.1.2.4

3. Verifying that the channel count rate is at least 3 cps:

~~a. Prior to control rod withdrawal,~~ L.3

b. Prior to and at least once per 12 hours during CORE ALTERATION(s),

c. At least once per 24 hours.

Add proposed SR 3.3.1.2.7 M.4

Table 3.3.1.2-1 Note c

[a] The use of special movable detectors during CORE ALTERATION(s) in place of the normal SRM neutron detectors is permissible as long as these special detectors are connected to the normal SRM circuits.

add proposed Note b to Table 3.3.1.2-1 L.7

Page 2 of 3

A.1

3.10 - LIMITING CONDITIONS FOR OPERATION **4.10 - SURVEILLANCE REQUIREMENTS**

SR 3.3.1.2.4 Note
SR 3.3.1.2.2

~~2. While in the core, these two fuel assemblies are in locations adjacent to the SRM; and~~ M.2

~~3. In the case of movable detectors, each group of fuel assemblies shall be separated by at least two fuel cell locations from any other fuel assemblies.~~ LA.3

ACTION:

ACTION E

With the requirements of the above specification not satisfied, immediately suspend all operations involving CORE ALTERATION(s) and fully insert all insertable control rods.

except for control rod insertion A.4

Initiate action to L.5

in core cells containing one or more fuel assemblies L.6

DISCUSSION OF CHANGES
ITS: 3.3.1.2 - SRM INSTRUMENTATION

ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 Per CTS 3.2.G Action 2, in MODES 3 and 4 a single control rod may have been withdrawn under the provisions of proposed Special Operations LCO 3.10.2 and LCO 3.10.3, or some unanticipated event may have resulted in uninserted control rods. Therefore, rather than an action to "verify...inserted," the ITS 3.3.1.2 Required Action D.1 is more definitive; "Fully insert...." This wording provides the same intent in the event all insertable control rods are found to be inserted, but also clarifies that any uninserted control rods are to be inserted.

A.3 A Note has been added to the Surveillance Requirements to provide direction for proper application of the Surveillance Requirements for Technical Specification compliance. This change represents a presentation preference only and is, therefore, considered administrative.

A.4 In the CTS 3.10.B Action (ITS 3.3.1.2 ACTION E), the phrase, "except for control rod insertion" has been added, since the CTS and ITS definition of a CORE ALTERATION includes control rod insertion. Since the intent of the action to suspend CORE ALTERATIONS was to stop any additional CORE ALTERATIONS, this change (which does not change this intent) is considered administrative in nature.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS 4.2.G.1 requires the SRM count rate to be verified to be within the limit prior to withdrawal of control rods. Proposed SR 3.3.1.2.4, requires the SR to be performed once per 24 hours in MODE 2 with IRMs on Range 2 or below and in MODES 3 and 4, regardless of whether or not control rods are withdrawn. Since it must be performed at all times, not just prior to control rod withdrawal, the phrase "prior to withdrawal of control rods" is not needed and has been deleted. Verifying the count rate every 24 hours will ensure the operators are aware of neutron flux levels at all times the SRMs are required to be Operable. This change is more restrictive on plant operation.

TECHNICAL CHANGES - MORE RESTRICTIVE (continued)

M.2 CTS 3.10.B Applicability provides exceptions to the MODE 5 requirements to maintain at least 2 source range monitor (SRM) channels OPERABLE. CTS 3.10.B Applicability does not require SRMs to be OPERABLE when no more than two fuel assemblies are present in each core quadrant with an SRM when those fuel assemblies are positioned adjacent to that quadrant's SRM. CTS 3.9.2 also provides specific criteria to be met if movable detectors are being used (see Discussion of Change LA.3). Proposed ITS 3.3.1.2 requires at least two SRM channels to be OPERABLE when in MODE 5 (unless performing a spiral offload or reload), but provides specific allowances in verifying OPERABILITY for conditions when the removal of fuel assemblies would not maintain the required count rate in proposed SR 3.3.1.2.4 and provides specific verification requirements for the positioning of the required OPERABLE SRM detectors in SR 3.3.1.2.2. These Surveillance Requirements encompass the allowances specified in the CTS 3.10.B Applicability. This change represents an additional restriction on plant operation necessary to ensure the SRMs are capable of monitoring reactivity changes in the core during refueling.

M.3 CTS 4.10.B.1.a requires verifying that the detector of an OPERABLE SRM channel is located in the core quadrant where CORE ALTERATIONS are being performed and one is located in the adjacent quadrant. ITS SR 3.3.1.2.2 requires verifying that an OPERABLE SRM detector is located in the fueled region; the core quadrant where CORE ALTERATIONS are being performed, when the associated SRM is included in the fueled region; and in a core quadrant adjacent to where CORE ALTERATIONS are being performed, when the associated SRM is included in the fueled region. As a result of providing the additional criteria on where the OPERABLE SRMs must be relocated, Note 2 to ITS SR 3.3.1.2.2 is also added to clarify that more than one of the three requirements of ITS SR 3.3.1.2.2 can be satisfied by the same SRM since only two SRMs are required to be OPERABLE. Providing additional criteria on where the SRMs must be located to satisfy the Surveillance represents an additional restriction on plant operation necessary to provide adequate coverage of potential reactivity changes in the core and to achieve consistency with NUREG-1433, Revision 1.

M.4 A new Surveillance Requirement has been added, proposed SR 3.3.1.2.7, requiring the SRMs to be calibrated every 24 months if in MODE 5. This SR verifies the performance of the SRM detectors and associated circuitry. This is an additional restriction on plant operation necessary to ensure the OPERABILITY of the SRMs during MODE 5.

TECHNICAL CHANGES - MORE RESTRICTIVE (continued)

M.5 A new restriction is added to CTS 4.2.G.3 and 4.10.B.2 (proposed SR 3.3.1.2.6 and proposed SR 3.3.1.2.5, respectively) to determine signal-to-noise ratio. This will ensure the count rate is being measured accurately (i.e., the detectors are inserted and actually measuring count rate from neutrons, not noise). This change is an additional restriction on plant operation.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The detail of the CTS 4.2.G.1 method for performing the Surveillance ("with the detector fully inserted") is proposed to be relocated to the Bases. The detail to be relocated is a procedural detail that is not necessary for assuring SRM OPERABILITY. Proposed SR 3.3.1.2.4, along with the other Surveillance Requirements of ITS 3.3.1.2 provide adequate assurance the SRMs are maintained OPERABLE. Therefore, the relocated detail is not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LA.2 The details of CTS 3.10.B, CTS 3.10.B.1, and CTS 4.10.B.1.b, relating to SRM OPERABILITY (in this case that the SRMs shall be inserted to the normal operating level with continuous visual indication in the control room) are proposed to be relocated to the Bases. These details for system OPERABILITY are not necessary in the LCO. The definition of OPERABILITY suffices. Therefore, the relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LA.3 CTS 3.10.B Applicability provides exceptions to the Operational MODE 5 requirements for source range monitors (SRMs). One of these addresses specific additional spatial limitations when movable detectors are being used. These spatial limitations are normally maintained by the fixed location of the SRMs within the core and are only necessary when movable detectors are used. These spatial limitations are relocated to the Bases to describe details for the application of SR 3.3.1.2.4 to movable detectors. The relocated details are not required to be in ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the Bases Control Program described in Chapter 5 of the ITS.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

LE.1 CTS 4.2.G.4 specifies the Frequency for SRM CHANNEL CALIBRATION as at least once every 18 months. Proposed SR 3.3.1.2.7 will extend the required Frequency to 24 months. Therefore, the Surveillance Test Interval of this SR is being increased from once every 18 months to once every 24 months for a maximum interval of 30 months including the 25% grace period. This function is performed by General Electric (GE) fission chambers (SRM detectors), GE Pulse Preamplifiers, and GE Source Range Monitors. Extending the SRM calibration interval from 18 months to 24 months is acceptable for the following reasons: The SRMs function is to measure changes in neutron level; SRMs satisfy their design function when shutdown if calibration is sufficient to ensure neutron level is observable when the reactor is shutdown and this is verified at least every 24 hours when the reactor is shutdown; SRMs satisfy their design function in Mode 2 if calibration is sufficient to ensure overlap with the IRMs and IRM/SRM overlap is verified prior to fully withdrawing SRMs; and, SRMs have no safety function and are not assumed to function during any UFSAR design basis accident or transient analysis. Additionally, SRM response to reactivity changes is distinctive and well known to plant operators and SRM response is closely monitored during these reactivity changes. Therefore, any substantial degradation of the SRMs will be evident prior to the scheduled performance of these tests. Based on the above discussion, the impact, if any, from the surveillance test frequency increase on system availability will be small. The equipment drift was evaluated utilizing a qualitative analysis. The results of this analysis supports a 24 month fuel cycle surveillance interval extension.

A review of the surveillance test history for each of these Surveillance requirements was performed to validate the above conclusion. This historical review of the surveillance test history demonstrates that there are no failures that would invalidate the conclusion that the impact, if any, of this change on system reliability is small.

"Specific"

L.1 Since CTS 3.2.G Action 1 only specifies an action for one required SRM inoperable during MODE 2, CTS 3.2.G requires a plant shutdown if two or more required SRMs become inoperable (in accordance with CTS 3.0.C). This requirement is unnecessarily restrictive and does not allow concentration of the efforts on repair when more than one required SRM is inoperable. The words "or more" are added (ITS 3.3.1.2 Condition A) to allow the action to apply to two or three inoperable SRMs (i.e., allow 4 hours to restore the inoperable SRMs). This is acceptable based on the limited risk of an event occurring during the time the SRMs are inoperable and the desire to concentrate efforts on repair,

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 (cont'd) rather than an immediate shutdown which is currently required by CTS 3.0.C, with one or no SRMs OPERABLE. Additionally, with no OPERABLE SRMs, the ability to monitor positive reactivity changes is significantly restricted, thus ITS 3.3.1.2 ACTION B is added to ensure that no further control rod withdrawal is allowed. Further, requiring an immediate plant shutdown could, with no SRMs OPERABLE, pose a greater risk since the APRMs and IRMs are inadequate for monitoring neutron flux in the source range.

L.2 CTS 3.2.G Action 2 requirement to "lock" the mode switch in Shutdown is proposed to be deleted from the Technical Specifications. The required position of the reactor mode switch in MODE 3 or 4 is adequately controlled by the MODES definition Table (ITS Table 1.1-1). Movement of the reactor mode switch from the Shutdown position is adequately controlled by ITS Table 1.1-1. Reactor mode switch positions other than Shutdown result in the unit entering some other MODE; with the associated Technical Specification compliance requirements of that MODE and of ITS 3.0.4.

L.3 CTS 4.2.G.3.a, 4.10.B.2.a, and 4.10.B.3.a (proposed SR 3.3.1.2.6, proposed SR 3.3.1.2.5, and proposed SR 3.3.1.2.4, respectively) require Surveillances to be performed prior to starting certain evolutions. These additional Surveillance Frequencies are redundant to Technical Specifications which requires the Surveillances to be performed periodically while in the applicable MODE or other specified condition, as required by CTS 3.0.A and proposed SR 3.0.1, and must be current prior to entering the applicable MODE or other specified condition as required by CTS 4.0.D and proposed SR 3.0.4. Once the applicable MODE or other specified condition is entered, the required periodic Frequencies have been determined to be sufficient verification that the source range monitors are properly functioning. Moving the reactor mode switch, withdrawing control rods, and performing CORE ALTERATIONS do not impact the ability of the monitors to perform their required function. Therefore, an additional Surveillance required to be performed "prior to" one of these events is an extraneous and unnecessary performance of a Surveillance.

L.4 CTS 4.10.B.3 requires verifying SRM count rate is at least 3 cps. The proposed ITS SR 3.3.1.2.4 Note allows SRM count rate to be below 3 cps with less than or equal to four fuel assemblies adjacent to the SRM provided no other fuel assemblies are located in the associated core quadrant. The requirement that no other fuel assemblies be located in the core quadrant where the SRM is located, ensures that even with a control rod withdrawn, the core configuration will not be critical. This change is acceptable since in the condition, even with a control rod withdrawn, the reactor cannot achieve criticality.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.5 The CTS 3.10.B Action to immediately "...insert all insertable control rods" is revised to "initiate action to insert all insertable control rods...." During MODE 5, it may not be possible to immediately insert all insertable control rods. In this situation, the CTS do not provide direction as to the action to take if control rods cannot be inserted immediately. As a result, the ITS provide a Required Action (ITS 3.3.1.2 Required Action E.2) to immediately initiate action and continue attempts to insert all insertable control rods. This change ensures that actions are taken to insert all insertable control rods in a timely manner while continuing to provide direction if attempts fail to immediately insert all insertable control rods. This change is considered to be acceptable since ITS 3.3.1.2 Required Action E.1 ensures the probability of occurrence of postulated events involving changes in reactivity in MODE 5 is minimized by suspension of CORE ALTERATIONS.

L.6 The CTS 3.10.B Action requires fully inserting all insertable control rods if one or more required SRMs are inoperable in MODE 5. In this condition, ITS 3.3.1.2 only requires inserting all insertable control rods in core cells containing one or more fuel assemblies (ITS 3.3.1.2 Required Action E.2). Control rods withdrawn from or inserted into a core cell containing no fuel assemblies have a negligible impact on the reactivity of the core and therefore are not required to be inserted to maintain the reactor subcritical.

L.7 A new Note has been added to CTS 3.10.B (ITS Table 3.3.1.2-1 Note b) that allows only one SRM to be OPERABLE under certain conditions. In MODE 5, during a spiral offload or reload, an SRM outside the fueled region will no longer be required to be OPERABLE, since it is not capable of monitoring normal changes in neutron flux in the fueled region of the core. However, the SRM detector in the fueled region must be OPERABLE, as required by proposed SR 3.3.1.2.2.a and Note 2 to SR 3.3.1.2.2 (see Discussion of Change M.3). The SRM count rate will be required during fuel loading when the SRM is in the fueled region and four bundles are around this SRM (as currently required by CTS 4.10.B.3 and modified by Discussion of Change L.4 and included in proposed SR 3.3.1.2.4).

L.8 CTS 4.2.B.1 and CTS 4.10.B.3 require the SRM count rate to be at least 3 cps. ITS SR 3.3.1.2.4 requires the verification that the SRM count rate is at least 3 cps or at least 0.7 cps with a signal to noise ratio $\geq$ 20:1. The optional count rate of at least 0.7 cps with a signal to noise ratio $>$ 20:1 is acceptable since the SRMs could still monitor neutron counts with the same confidence as in the current value. The high signal to noise ratio is required so that the SRM can distinguish between actual counts and noise at the lower count rates.

RELOCATED SPECIFICATIONS

None

ITS 3.3.2.1

A.1

3.2 - LIMITING CONDITIONS FOR OPERATION

E. Control Rod Block Actuation

LCO 3.3.2.1 The control rod block actuation instrumentation CHANNEL(s) shown in Table 3.2.E-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the ~~Trip Setpoint~~ Allowable Value column. A.2

APPLICABILITY:

As shown in Table 3.2.E-1.

ACTION:

ACTIONS A and B - 1. With a control rod block actuation instrumentation CHANNEL trip setpoint less conservative than the value shown in the ~~Trip Setpoint~~ Allowable Value column of Table 3.2.E-1, declare the CHANNEL inoperable until the CHANNEL is restored to OPERABLE status with its trip setpoint adjusted consistent with the ~~Trip Setpoint~~ value. A.2

ACTIONS A and B 2. With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, take the ACTION required by Table 3.2.E-1.

4.2 - SURVEILLANCE REQUIREMENTS

E. Control Rod Block Actuation

Each of the required control rod block actuation TRIP SYSTEM(s) and instrumentation CHANNEL(s) shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION ~~operations~~ for the OPERATIONAL MODE(s) and at the frequencies shown in Table 4.2.E-1.

Note 1 to Surveillance Requirements

A.1

Table 3.3.2.1-1

~~TABLE 3.2.E-1~~

CONTROL ROD BLOCK INSTRUMENTATION

A.2 LA.1 LF.1 A.3 R.1

Function ~~Functional Unit~~	Allowable Value ~~Trip Setpoint~~	Minimum CHANNEL(s) per Trip Function[f]	Applicable OPERATIONAL MODE(s)	ACTION
1. ~~1.~~ ROD BLOCK MONITORS[b]				
a. ~~a.~~ Upscale	As specified in COLR	2	1[a]	~~50~~ A, B
b. ~~b.~~ Inoperative	NA	2	1[a]	~~50~~ A, B
c. ~~c.~~ Downscale	≥3/125 of full scale	2	1[a]	~~50~~ A, B
~~2. AVERAGE POWER RANGE MONITORS~~				
~~a. Flow Biased Neutron Flux - High~~				
~~1. Dual Recirculation Loop Operation~~	~~≤(0.58W + 50)[d]~~	~~4~~	~~1~~	~~51~~
~~2. Single Recirculation Loop Operation~~	~~≤(0.58W + 46.5)[d]~~	~~4~~	~~1~~	~~51~~
~~b. Inoperative~~	~~NA~~	~~4~~	~~1, 2, 5[h]~~	~~51~~
~~c. Downscale~~	~~≥3/125 of full scale~~	~~4~~	~~1~~	~~51~~
~~d. Startup Neutron Flux - High~~	~~≤12/125 of full scale~~	~~4~~	~~2, 5[h]~~	~~51~~

ITS 3.3.2.1

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ITS 3.3.2.1

A.1

Table 3.3.2.1-1

TABLE 3.2.E-1 (Continued)

CONTROL ROD BLOCK INSTRUMENTATION

Functional Unit	Trip Setpoint	Minimum CHANNEL(s) per Trip Function(a)	Applicable OPERATIONAL MODE(s)	ACTION
3. SOURCE RANGE MONITORS				
a. Detector not full in(e)	NA	3 2	2(f) 5(f)	51 51
b. Upscale(e)	≤1 x 10^5 cps	3 2	2 5	51 51
c. Inoperative(e)	NA	3 2	2 5	51 51
4. INTERMEDIATE RANGE MONITORS				
a. Detector not full in	NA	6	2, 5	51
b. Upscale	≤ 108/125 of full scale	6	2, 5	51
c. Inoperative	NA	6	2, 5	51
d. Downscale(d)	≥ 3/125 of full scale	6	2, 5	51

R.1

ITS 3.3.2.1

A.1

Table 3.3.2.1-1

TABLE 3.2.E-1 (Continued)

CONTROL ROD BLOCK INSTRUMENTATION

Functional Unit	Trip Setpoint	Minimum CHANNEL(s) per Trip Function$^{(a)}$	Applicable OPERATIONAL MODE(s)	ACTION
5. SCRAM DISCHARGE VOLUME (SDV)				
a. Water Level - High	≤25 gal	1 per bank	1, 2, 5$^{(m)}$	52
b. SDV Switch in Bypass	NA	1	5$^{(m)}$	52

R.1

Add proposed Function 3, "Reactor Mode Switch - Shutdown Position"

M.1

Page 4 of 12

A.1

Table 3.3.2.1-1

TABLE 3.2.E-1 (Continued)

CONTROL ROD BLOCK INSTRUMENTATION

ACTION

ACTIONS A and B **ACTION 50 -** Declare the rod block monitor inoperable and take the ACTION required by Specification 3.3.M.

R.1

~~**ACTION 51-** With the number of OPERABLE CHANNEL(s):~~

~~a. One less than required by the Minimum CHANNEL(s) per Trip Function requirement, restore the inoperable CHANNEL to OPERABLE status within 7 days or place the inoperable CHANNEL in the tripped condition within the next hour.~~

~~b. Two or more less than required by the Minimum CHANNEL(s) per Trip Function requirement, place at least one inoperable CHANNEL in the tripped condition within one hour.~~

~~**ACTION 52 -** With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, place the inoperable CHANNEL in the tripped condition within one hour.~~

12 hours A.4

A.1

ITS 3.3.2.1

Table 3.3.2.1-1

TABLE 3.2.E-1 (Continued)

CONTROL ROD BLOCK INSTRUMENTATION

TABLE NOTATION

A.3

(a) ~~The RBM shall be automatically bypassed when a peripheral control rod is selected.~~ LA.1

(b) ~~This function shall be automatically bypassed if the IRM channels are on range 3 or higher.~~

(c) ~~This function shall be automatically bypassed when the associated IRM channels are on range 8 or higher.~~

(d) ~~This function shall be automatically bypassed when the IRM channels are on range 1.~~ R.1

Table 3.3.2.1-1 Note (a) (e) With THERMAL POWER ≥30% of RATED THERMAL POWER and no peripheral control rod selected A.3

(f) ~~With more than one control rod withdrawn. Not applicable to control rods removed per Specification 3.10.I or 3.10.J.~~ R.1

(g) ~~The Average Power Range Monitor rod block function is varied as a function of recirculation loop flow (W). The trip setting of this function must be maintained in accordance with Specification 3.11.B. W is equal to the percentage of the drive flow required to produce a rated core flow of 98 x 10^6 lbs/hr.~~

(h) ~~Required to be OPERABLE only during SHUTDOWN MARGIN demonstrations performed per Specification 3.12.B.~~

(i) ~~A CHANNEL may be placed in an inoperable status for up to 2 hours for required surveillance without placing the CHANNEL in the tripped condition provided the Functional Unit maintains control rod block capability.~~

(j) ~~With detector count rate less than or equal to 100 cps.~~ R.1

Insert CTS Table 3.2.E-1 A.4

Insert CTS Table 3.2.E-1

A.4

~~Insert 15, Page 3/4.2-34~~

(i) When a CHANNEL is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required ACTIONs may be delayed for up to 6 hours provided the Functional Unit maintains rod block actuation capability.

Note 2 to Surveillance Requirements

ITS 3.3.2.1

A.1

Table 3.3.2.1-1

~~TABLE 4.2.E-1~~

CONTROL ROD BLOCK INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Note to SR 3.3.2.1.4

Function Functional Unit	CHANNEL CHECK	SR 3.3.2.1.1 CHANNEL FUNCTIONAL TEST	SR 3.3.2.1.4 CHANNEL CALIBRATION$^{(a)}$	Applicable OPERATIONAL MODE(s)
1. **1. ROD BLOCK MONITORS**				
a. a. Upscale	NA	~~S/U$^{(b)}$, M$^{(f)}$~~ Q	Q -4	1$^{(d)}$
b. b. Inoperative	NA	~~S/U$^{(b)}$, M$^{(f)}$~~ Q	NA	1$^{(d)}$
c. c. Downscale	NA	~~S/U$^{(b)}$, M$^{(g)}$~~ Q	Q -4	1$^{(d)}$
~~**2. AVERAGE POWER RANGE MONITORS**~~				
~~a. Flow Biased Neutron Flux - High~~				
~~1. Dual Recirculation Loop Operation~~	~~NA~~	~~S/U$^{(b)}$, M~~ Q	~~SA~~	~~1~~
~~2. Single Recirculation Loop Operation~~	~~NA~~	~~S/U$^{(b)}$, M~~ Q	~~SA~~	~~1~~
~~b. Inoperative~~	~~NA~~	~~S/U$^{(b)}$, M~~ Q	~~NA~~	~~1, 2, 5$^{(j)}$~~
~~c. Downscale~~	~~NA~~	~~S/U$^{(b)}$, M~~ Q	~~SA~~	~~1~~
~~d. Startup Neutron Flux - High~~	~~NA~~	~~S/U$^{(b)}$, M~~ Q	~~SA~~	~~2, 5$^{(j)}$~~
~~**3. SOURCE RANGE MONITORS**~~				
~~a. Detector not full in$^{(i)}$~~	~~NA~~	~~S/U$^{(b)}$, W~~	~~E~~	~~2$^{(h)(i)}$, 5$^{(h)}$~~
~~b. Upscale$^{(e)}$~~	~~NA~~	~~S/U$^{(b)}$, W~~	~~E~~	~~2$^{(h)}$, 5~~
~~c. Inoperative$^{(e)}$~~	~~NA~~	~~S/U$^{(b)}$, W~~	~~NA~~	~~2$^{(h)}$, 5~~

L.1

LA.2

A.3

1

A.4

A.4

R.1

M.2

Add proposed SR 3.3.2.1.5

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Table 3.3.2.1-1

TABLE 4.2.E-1 (Continued)

CONTROL ROD BLOCK INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

A.1

Functional Unit	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION^(a)	Applicable OPERATIONAL MODE(s)
4. INTERMEDIATE RANGE MONITORS				
a. Detector not full in	NA	S/U^(m), W	E	2^#, 5
b. Upscale	NA	S/U^(m), W	E	2^#, 5
c. Inoperative	NA	S/U^(m), W	NA	2^#, 5
d. Downscale^(m)	NA	S/U^(m), W	E	2^#, 5
5. SCRAM DISCHARGE VOLUME (SDV)				
a. Water Level - High	NA	Q	NA	1, 2, 5^(e)
b. SDV Switch in Bypass	NA	E	NA	5^(e)

R.1

Add proposed Function 3, "Reactor Mode Switch - Shutdown Position" surveillance SR 3.3.2.1.7

M.1

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A.1

Table 3.3.2.1-1
TABLE 4.2.E-1 (Continued)

CONTROL ROD BLOCK INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATION

Note to SR 3.3.2.1.4 and SR 3.3.2.1.5

(a) Neutron detectors may be excluded from CHANNEL CALIBRATION.

~~(b) Within 7 days prior to startup.~~ L.1

~~(c) Includes reactor manual control "relay select matrix" system input.~~ LA.2

Table 3.3.2.1-1 Note (a)

(d) With THERMAL POWER ≥30% of RATED THERMAL POWER and no peripheral rod is selected A.3

~~(e) With more than one control rod withdrawn. Not applicable to control rods removed per Specification 3.10.I or 3.10.J.~~

~~(f) This function shall be automatically bypassed if the IRM channels are on range 3 or higher.~~

~~(g) This function shall be automatically bypassed when the associated IRM channels are on range 8 or higher.~~

~~(h) This function shall be automatically bypassed when the IRM channels are on range 1.~~

~~(i) The provisions of Specification 4.0.D are not applicable to the CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION surveillances for entry into the applicable OPERATIONAL MODE(s) from OPERATIONAL MODE 1 provided the surveillances are performed within 12 hours after such entry.~~

~~(j) Required to be OPERABLE only during SHUTDOWN MARGIN demonstrations performed per Specification 3.12.B.~~

~~(k) With detector count rate less than or equal to 100 cps.~~

R.1

A.1

ITS 3.3.2.1

3.3 - LIMITING CONDITIONS FOR OPERATION

L. Rod Worth Minimizer (RWM)

LCO 3.3.2.1 and Table 3.3.2.1-1 Function 2

The rod worth minimizer (RWM) shall be OPERABLE.

APPLICABILITY: M.3

OPERATIONAL MODE(s) 1 and 2[a], when thermal power is less than or equal to 10% of RATED THERMAL POWER.

M4 add proposed Required Actions C.2.1.1 and C.2.1.2

ACTION:

Conditions C and D

With the RWM inoperable,

Required Actions C.2.2 and D.1

verify control rod movement and compliance with the prescribed control rod pattern by a second licensed operator or technically qualified individual who is present at the reactor control console.

Required Action C.1

Otherwise, control rod movement may be made only by actuating the manual scram or placing the reactor mode switch in the Shutdown position.

L.2 Add proposed Note to SR 3.3.2.1.3

4.3 - SURVEILLANCE REQUIREMENTS

L. Rod Worth Minimizer (RWM)

The RWM shall be demonstrated OPERABLE:

SR 3.3.2.1.8

1. By verifying that the control rod patterns and sequence input to the RWM computer are correctly loaded following any loading of the program into the computer.

Add proposed Note to SR 3.3.2.1.2 L.2

SR 3.3.2.1.2

2. In OPERATIONAL MODE 2 within 8 hours prior to withdrawal of control rods for the purpose of making the reactor critical: M.3

   a. ~~by verifying proper indication of the selection error of at least one out-of-sequence control rod.~~ LA.2

   b. ~~by verifying the rod block function.~~

SR 3.3.2.1.3

3. In OPERATIONAL MODE 1 prior to reducing thermal power below 10% of RATED THERMAL POWER: L.2

   a. ~~by verifying proper indication of the selection error of at least one out-of-sequence control rod.~~ LA.2

   b. ~~by verifying the rod block function.~~

Add proposed SR 3.3.2.1.6 M.5

add proposed SR 3.3.2.1.9 M.6

M.3

[a] Entry into OPERATIONAL MODE 2 and withdrawal of selected control rods is permitted for the purpose of determining the OPERABILITY of the RWM prior to withdrawal of control rods for the purpose of bringing the reactor to criticality.

ITS 3.3.2.1

A.1

3.3 - LIMITING CONDITIONS FOR OPERATION

M. Rod Block Monitor (RBM)

LCO 3.3.2.1 and Table 3.3.2.1-1 Function 1

Both rod block monitor (RBM) CHANNEL(s) shall be OPERABLE.

APPLICABILITY:

A3

~~OPERATIONAL MODE 1, when~~ thermal power is greater than or equal to 30% of RATED THERMAL POWER and no peripheral rod is selected

ACTION:

1. With one RBM CHANNEL inoperable:

   a. ~~Verify that the reactor is not operating in a LIMITING CONTROL ROD PATTERN, and~~ L.3

   ACTION A

   b. Restore the inoperable RBM CHANNEL to OPERABLE status within 24 hours.

ACTION B

2. With the provisions of ACTION 1 above not met, place the inoperable rod block monitor CHANNEL in the tripped condition within the next one hour.

3. With both RBM CHANNEL(s) inoperable, place at least one inoperable rod block monitor CHANNEL in the tripped condition within one hour.

4.3 - SURVEILLANCE REQUIREMENTS

M. Rod Block Monitor (RBM)

Each of the required RBM CHANNEL(s) shall be demonstrated OPERABLE by performance of a:

SR 3.3.2.1
SR 3.3.2.1.4

1. CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION at the frequencies and for the OPERATIONAL MODE(s) specified in Table 4.2.E-1.

2. ~~CHANNEL FUNCTIONAL TEST prior to control rod withdrawal when the reactor is operating in a LIMITING CONTROL ROD PATTERN, but no more often than daily.~~ L.3

ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 CTS 3.2.E requires the control rod block actuation instrumentation setpoints to be set consistent with the Trip Setpoint values shown in Table 3.2.E-1. CTS 3.2.E Action 1 requires the CHANNEL to be declared inoperable when the setpoint is less conservative than the value shown in the Trip Setpoint column of Table 3.2.E-1. Table 3.2.E-1 includes a "Trip Setpoint" column. It is proposed to re-label this column as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1 (ISTS Table 3.3.2.1-1). In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS Table 3.2.E-1 are applied as the Operability limits for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual trip setpoints specified in CTS Table 3.2.E-1 for the control rod block Functions or the Allowable Values specified in ITS Table 3.3.2-1 (see Discussion of Change LF.1 below for proposed changes to the trip setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

A.3 The Applicability for CTS Tables 3.2.E-1 and 4.2.E-1 Trip Functions 1.a, 1.b, and 1.c., including footnotes (e) and (d) respectively, and CTS 3/4.3.M is "OPERATIONAL CONDITION 1, when THERMAL POWER is greater than or equal to 30% of RATED THERMAL POWER." With THERMAL POWER ≥ 30% RTP, the unit will always be in MODE 1. Therefore, it is unnecessary to state MODE 1 in the Applicability of CTS Tables 3.2.E-1 and 4.2.E-1, Trip Functions 1.a, 1.b, and 1.c, and CTS 3/4.3.M (ITS Table 3.3.2.1-1, Functions 1.a, 1.b, and 1.c). In addition, CTS Tables 3.2.E-1 and 4.2.E-1 footnotes (e) and (d) respectively and LCO 3.3.M (ITS Table 3.3.2.1-1 Note (a)) have been modified to not require the RBM to be Operable when a peripheral control rod is selected. The RBM design includes an automatic bypass when a peripheral rod is selected as described in CTS Table 3.2.E-1, Note (a). Therefore, since it is part of the design, this change is considered administrative.

ADMINISTRATIVE (continued)

A.4 These changes to CTS 3/4.2.E are provided in Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 27, 1999. The changes identified are consistent with the allowances in NEDC-30851-P-A, Supplement 1 "Technical Specification Improvement Analysis for BWR Control Rod Block Instrumentation," October 1988 and GENE-770-06-1-A, "Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for selected Instrumentation Technical Specifications," December 1992. As such, these changes are administrative.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 An additional Function has been added to CTS Tables 3.2.E-1 and 4.2.E-1. ITS 3.3.2.1, Control Rod Block Instrumentation, will include the control rod block function of the Reactor Mode Switch—Shutdown Position as a required function (Function 3 on proposed Table 3.3.2.1-1). The new requirement is for 2 channels of the control rod block function of Reactor Mode Switch—Shutdown Position to be Operable whenever the reactor mode switch is in the shutdown position. This addition to the Specification for the Control Rod Block Instrumentation will include SR 3.3.2.1.7 (CHANNEL FUNCTIONAL TEST every 24 months) and proposed LCO 3.3.2.1, ACTION E if this function is inoperable. ITS SR 3.3.2.1.7 will not be required to be performed until 1 hour after the reactor mode switch is placed in the shutdown position. This rod block ensures that control rods are not withdrawn in MODES 3 and 4, since control rods are assumed to be inserted. This change is consistent with BWR ISTS, NUREG-1433, Revision 1.

M.2 A new RBM Surveillance has been added (proposed SR 3.3.2.1.5) to verify the automatic enabling points of the RBM. This SR ensures that the RBM Functions are not inadvertently bypassed with power level $\geq$ 30% RTP and with a peripheral control rod not selected. This is an additional restriction on plant operation to ensure the proper operation of the RBM.

M.3 The CTS 3/4.3.L footnote (a) allows entry into MODE 2 for the purpose of determining RWM Operability before withdrawal of control rods for the purpose of bringing the reactor critical. Also, CTS 4.3.L.2 only requires the RWM to be tested prior to the withdrawal of control rods for the purpose of making the reactor critical. The Note to proposed SR 3.3.2.1.2 will require the RWM to be

TECHNICAL CHANGES - MORE RESTRICTIVE

M.3 (cont'd) determined Operable (by performing a CHANNEL FUNCTIONAL TEST) within 1 hour after withdrawal of any control rod when RTP is ≤ 10%, not just when the withdrawal is for the purpose of making the reactor critical. This change is necessary to ensure the safety analysis assumptions concerning control rod worth are maintained by ensuring the RWM is Operable during any potential change in control rod worth. This is an additional restriction on plant operation.

M.4 With the RWM inoperable, the CTS 3.3.L Action allows control rod movement to continue provided a second licensed operator or other qualified member of the technical staff verifies control rod movement is in compliance with the prescribed control rod sequence. In ITS 3.3.2.1, with the RWM inoperable during a reactor startup, continued movement of control rods will only be allowed if ≥ 12 control rods are withdrawn (ITS 3.3.2.1 Required Action C.2.1.1) or if a startup with RWM inoperable has not been performed in the last calendar year (ITS 3.3.2.1 Required Action C.2.1.2). These new requirements are being added to ensure the RWM is reliable. These changes are additional restrictions on plant operation.

M.5 A new RWM Surveillance has been added (proposed SR 3.3.2.1.6) to verify the automatic enabling point of the RWM. This SR ensures that the RWM is not inadvertently bypassed with power level ≤ 10% RTP. This is an additional restriction on plant operation to ensure proper operation of the RWM.

M.6 A new RWM Surveillance has been added (proposed SR 3.3.2.1.9) to verify the bypassing and position of control rods required to be bypassed in RWM by a second licensed operator or other qualified member of the technical staff. This is required prior to and during the movement of control rods bypassed in RWM. This is an additional restriction on plant operation to ensure proper operation of the RWM.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 CTS Table 3.2.E-1 Note (a) states that the RBM shall be automatically bypassed when a peripheral control rod is selected. This system design detail is proposed to be relocated to the UFSAR. This design detail is not necessary to be included in the Technical Specifications to ensure the OPERABILITY of the RBM instrumentation since OPERABILITY requirements are adequately addressed in ITS 3.3.2.1. In addition, when a peripheral control rod is selected, RBM is automatically bypassed and cannot generate a rod block. Therefore, the

TECHNICAL CHANGES - LESS RESTRICTIVE

LA.1 (cont'd) Applicabilities for the RBM Functions have been modified to be ≥ 30% RTP and no peripheral control rod selected, consistent with the design and CTS Table 3.2.E-1 Note (a) (see Discussion of Change A.3 above). As such, the relocated detail is not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the UFSAR will be controlled by the provisions of 10 CFR 50.59.

LA.2 Details in Table 4.2.E-1 Function 1 footnote c, CTS 4.3.L.2.a and b, and CTS 4.3.L.3.a and b of the methods for performing Surveillances are proposed to be relocated to the Bases. The requirements proposed to be relocated are procedural details that are not necessary for assuring control rod block instrumentation OPERABILITY. The Surveillance Requirements of ITS 3.3.2.1 provide adequate assurance the control rod block instrumentation are maintained OPERABLE. As such, the relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

L.1 The Surveillance Frequency of "S/U" and Note (b), "within 7 days prior to startup," associated with the CHANNEL FUNCTIONAL TEST of the RBM Functions in CTS Table 4.3.E-1 is deleted. The requirements of CTS 4.0.A and 4.0.D (ITS SR 3.0.1 and SR 3.0.4) require the Surveillance to be performed and current prior to entry into the applicable Operational Conditions. Additionally, once the applicable Conditions are entered, the periodic Surveillance Frequency (92) days) has been determined to provide adequate assurance of RBM OPERABILITY per the reliability analysis of NEDO-30851P-A, "Technical Specifications Improvement Analysis for BWR Control Rod Block Instrumentation," dated October 1988. Also, the increased testing prior to startup increases the wear on the instruments, thereby reducing overall reliability. Therefore, an additional Surveillance other than the quarterly Surveillance (ITS SR 3.3.2.1.1) is not needed to assure the instruments will perform their associated safety function.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.2 CTS 4.3.L.2 requires a RWM CHANNEL FUNCTIONAL TEST to be performed within 8 hours prior to withdrawal of control rods for the purpose of making the reactor critical and CTS 4.3.L.3 requires a RWM CHANNEL FUNCTIONAL TEST to be performed prior to reducing thermal power to < 10% RTP. Proposed SRs 3.3.2.1.2 and 3.3.2.1.3 are similar to CTS 4.3.L.2 and 4.3.L.3, except a test Frequency is specified (92 days). This change effectively extends the CHANNEL FUNCTIONAL TEST to 92 days, i.e., the CHANNEL FUNCTIONAL TEST is not required to be performed if a startup or shutdown occurs within 92 days of a previous startup or shutdown. The RWM is a reliable system, as shown by both a review of maintenance history and by successful completion of previous startup surveillances. As a result, the effect on safety due to the extended Surveillance is small. Also, the increased testing prior to each startup and shutdown increases the wear on the instruments, thereby reducing overall reliability. Therefore, an additional Surveillance other than the quarterly Surveillance is not needed to assure the instruments will perform their associated safety function. In addition, other similar rod block functions have a 92 day CHANNEL FUNCTIONAL TEST. Notes are also being added to CTS 4.3.L.2 and 3. The Note to proposed SR 3.3.2.1.2 exempts the CHANNEL FUNCTIONAL TEST requirement of the RWM until 1 hour after any control rod is withdrawn at ≤ 10% RTP in MODE 2. The Note to proposed SR 3.3.2.1.3 exempts the CHANNEL FUNCTIONAL TEST requirement of the RWM until 1 hour after THERMAL POWER is ≤ 10% RTP in MODE 1. These changes are acceptable since the only way the required Surveillances can be performed prior to entry in the specified condition is by utilizing jumpers or lifted leads. Use of these devices is not recommended since minor errors in their use may significantly increase the probability of a reactor transient or event which is a precursor to a previously analyzed accident. Therefore, time is allowed to conduct the Surveillances after entering the specified condition.

L.3 CTS 3.3.M Action 1.a, which requires verification that the reactor is not operating on a LIMITING CONTROL ROD PATTERN when one RBM channel is inoperable, and Surveillance Requirement 4.3.M.2, which requires a CHANNEL FUNCTIONAL TEST prior to control rod withdrawal when the reactor is operating on a LIMITING CONTROL ROD PATTERN, have been deleted. The definition of LIMITING CONTROL ROD PATTERN is also being deleted. Since a LIMITING CONTROL ROD PATTERN is operation on a power distribution limit (such as APLHGR or MCPR), the condition is extremely unlikely. The status of power distribution limits does not affect the Operability of the RBM and therefore, no additional requirements on the RBM System are

TECHNICAL CHANGES - LESS RESTRICTIVE

L.3 (cont'd) required (e.g., that it be tripped within one hour with a channel inoperable while on a LIMITING CONTROL ROD PATTERN). Adequate requirements on power distribution limits are specified in the LCOs in Section 3.2. Furthermore, due to the improbability of operating exactly on a thermal limit, the CTS Action and Surveillance Requirement would almost never be required. In addition, since the Surveillance Requirement is not specific as to when "prior to," and could be satisfied by the initial Surveillance that detected the LIMITING CONTROL ROD PATTERN has been achieved, its deletion is not safety significant.

RELOCATED SPECIFICATIONS

R.1 The SRM, IRM, Scram Discharge Volume, and APRM control rod blocks of CTS 3/4.2.E function to prevent a positive reactivity insertion under conditions approaching those where RPS actuation may be expected. However, no design basis accident or transient takes credit for rod block signals initiated by this instrumentation. Further, the evaluation summarized in NEDO-31466 determined the loss of this instrumentation to be a non-significant risk contributor to core damage frequency and offsite release. Therefore, the requirements specified for these Functions in CTS 3/4.2.E did not satisfy the NRC Policy Statement Technical Specification screening criteria as documented in the Application of Selection Criteria to the Quad Cities 1 and 2 Technical Specifications and have been relocated to the Technical Requirements Manual (TRM). The TRM will be incorporated by reference into the Quad Cities 1 and 2 UFSAR at ITS implementation. Changes to the TRM will be controlled in accordance with 10 CFR 50.59.

A.1

M.1 System and Main Turbine High Water Level Trip

ITS 3.3.2.2

3.2 - LIMITING CONDITIONS FOR OPERATION

J. Feedwater ~~Pump Trip~~

M.1 system and main turbine

LCO 3.3.2.2 The feedwater ~~pump~~ trip instrumentation CHANNEL(s) shown in Table 3.2.J-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the ~~Trip Setpoint~~ column of Table 3.2.J-1.

Allowable Value A.2

APPLICABILITY:

~~OPERATIONAL MODE 1~~

THERMAL POWER ≥ 25% RTP L.1

M.1 system and main turbine

ACTION:

ACTIONS A and B

With a feedwater ~~pump~~ trip instrumentation CHANNEL trip setpoint less conservative than the value shown in the ~~Trip Setpoint~~ column of Table 3.2.J-1, declare the CHANNEL inoperable and take the ACTION shown in Table 3.2.J-1

Allowable Value A.2

4.2 - SURVEILLANCE REQUIREMENTS

J. Feedwater ~~Pump Trip~~

SR 3.3.2.2.1
SR 3.3.2.2.2
SR 3.3.2.2.3

1. Each feedwater pump trip instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.2.J-1.

SR 3.3.2.2.4

2. LOGIC SYSTEM FUNCTIONAL TEST(s) of all CHANNEL(s) shall be performed at least once per ~~18~~ 24 LD.1 months.

including breaker and valve actuation M.2

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A.1

ITS 3.3.2.2

TABLE 3.2.J-1

FEEDWATER PUMP TRIP INSTRUMENTATION

Functional Unit	Trip Setpoint[a]	Minimum CHANNEL(s)[b]	ACTION
Reactor Vessel Water Level -High LCO 3.3.2.2	≤201 inches	2	90 A, B

Allowable Value A.2

LF.1

Note to Surveillance Requirements

ACTION

ACTION 90 - ACTION A a. With the number of OPERABLE CHANNEL(s) one less than required by the Minimum CHANNEL(s) requirement, restore the inoperable CHANNEL to OPERABLE status within 7 ~~days or place the inoperable CHANNEL in the tripped condition within the next 8 hours.~~

trip capability M.3 2 hours

ACTION A b. With the number of OPERABLE CHANNEL(s) two less than required by the Minimum CHANNEL(s) requirement, restore at least one of the inoperable CHANNEL(s) to OPERABLE status within 72 hours or be in at least STARTUP within the next 8 hours.

trip capability M.3 2

Required Action B 2

add proposed Required Action B.1. L.2

<25% L.1 4

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a Reactor vessel water level settings are expressed in inches above the top of active fuel (which is 360 inches above vessel zero).

LA.1

b A CHANNEL may be placed in an inoperable status for up to 2 hours for required surveillance without placing the CHANNEL in the tripped condition.

Note to Surveillance Requirements

Page 2 of 3

A.1

ITS 3.3.2.2

TABLE 4.2.J-1

FEEDWATER PUMP TRIP INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Functional Unit	SR 3.3.2.2.1 CHANNEL CHECK	SR 3,3,2.2.2 CHANNEL FUNCTIONAL TEST	SR 3.3.2.2.3 CHANNEL CALIBRATION
Reactor Vessel Water Level - High	D - 1	~~E~~ - 2 92 days M.4	~~E~~ - 2

LCO 3.3.2.2

DISCUSSION OF CHANGES
ITS: 3.3.2.2 - FEEDWATER SYSTEM AND MAIN TURBINE HIGH WATER LEVEL TRIP INSTRUMENTATION

ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 CTS 3.2.J requires the feedwater pump trip instrumentation setpoints to be set consistent with the Trip Setpoint values shown in Table 3.2.J-1. The CTS 3.2.J Action requires the CHANNEL to be declared inoperable when the setpoint is less conservative than the value shown in the Trip Setpoint column of Table 3.2.J-1. Table 3.2.J-1 includes a "Trip Setpoint" column. It is proposed to re-label this column as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1. In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS Table 3.2.J-1 are applied as the Operability limits for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual trip setpoints specified in CTS Table 3.2.J-1 for the Reactor Vessel Water Level—High Function or the Allowable Value specified in ITS SR 3.3.2.2.3 (see Discussion of Change LF.1 below for proposed changes to the Trip Setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS 3/4.2.J requires the Feedwater Pump Trip Reactor Water Level — High Function Channels to be OPERABLE. The feedwater flow runout transient requires both feedwater system and main turbine trip capability to ensure the safety analysis is met. The closure of the turbine stop valves results in a Reactor Protection System Trip. Therefore, the requirement of this Specification has been changed to require these channels to be capable of also tripping the main turbine. The Specification title, LCO and Required Actions have been modified to reflect this change as indicated in proposed ITS 3.3.2.2. This change is more restrictive since it imposes additional restrictions on plant operations. This change is necessary to ensure the transient analysis is met.

TECHNICAL CHANGES - MORE RESTRICTIVE (continued)

M.2 CTS 4.2.J.2 requires the performance of a LOGIC SYSTEM FUNCTIONAL TEST of all CHANNEL(s). This requirement is retained in ITS SR 3.3.2.2.4, however additional testing is imposed to ensure the trip of the feedwater pump breakers and closure of the turbine stop valves. This change is necessary since LOGIC SYSTEM FUNCTIONAL TEST would not require the actuation of the components since these components are normally tested in the system Specification. In this case, there is no system Specification, therefore the breakers and valves must be tested along with this test, to help ensure complete testing of the assumed safety function.

M.3 CTS Table 3.2.J-1 Action 90.a allows 7 days to restore a channel to OPERABLE status and then allows an additional 8 hours to trip the channel if not restored to OPERABLE status. CTS Table 3.2.J-1 Action 90.b allows 72 hours to restore at least one channel to OPERABLE status when two channels are found to be inoperable. In ITS 3.3.2.2, both of these conditions have been combined into one ACTION which allows 2 hours to restore feedwater system and main turbine high water level trip capability (ITS 3.3.2.2 ACTION A). The Feedwater System and Main Turbine High Water Level Trip Instrumentation channel logic design is a two-out-of-two for trip actuation. Therefore, with any channel inoperable trip capability is lost. This 2 hour Completion Time is consistent with ITS 3.2.2 since this instrumentation's purpose is to preclude a MCPR violation. This change is an additional restriction on plant operation.

M.4 CTS Table 4.2.J-1 requires the performance of a CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION once per 18 months. ITS SR 3.3.2.2.2 and SR 3.3.2.2.3 require the performance of a CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION once per 92 days. This change is consistent with current plant practice. The change represents an additional restriction on plant operation since the more restrictive surveillance frequency of 92 days will be included in Technical Specifications. This change is necessary to ensure the associated instrumentation is maintained OPERABLE.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The detail in CTS Table 3.2.J-1 Note (a) related to the reference setting of the reactor vessel water level instrumentation is proposed to be relocated to the UFSAR. This detail is not necessary to ensure the OPERABILITY of the Feedwater System and Main Turbine High Water Level Instrumentation. The requirements of ITS 3.3.2.2 and its associated SRs are adequate to ensure the associated reactor vessel water level instrumentation is maintained OPERABLE. Therefore, the relocated detail is not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the UFSAR will be controlled by the provisions of 10 CFR 50.59

LD.1 The Frequency for performing the LOGIC SYSTEM FUNCTIONAL TEST of CTS 4.2.J.2 (proposed SR 3.3.2.2.4) has been extended from 18 months to 24 months. This surveillance ensures the Feedwater System/Main Turbine High Water Level trip function will operate properly during the corresponding transients of the UFSAR where this function is required, such as a Feedwater Controller Failure. The proposed change will allow this Surveillance to extend the Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that this test normally passes the Surveillance at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. The Feedwater System/Main Turbine High Water Level trip function is tested on a more frequent basis during the operating cycle in accordance with a CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION (proposed SR 3.3.2.2.1, SR 3.3.2.2.2, and SR 3.3.2.2.3). These surveillances will detect significant failures of the circuitry. In addition, since these water level channels provide indication to the control room (Panel 901(2)-5), deviations will be detected and repaired during plant operation. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd)

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the Feedwater System/Main Turbine High Water Level trip circuit design, the more frequent surveillances performed during the operating cycle and the ability to detect deviations during operation, and the review of historical and surveillance data, it is shown that the impact, if any, on system availability is minimal as a result of this change. In addition, the proposed 24 month Surveillance Frequency, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) does not invalidate any assumptions in the plant licensing basis.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained.

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

L.1 The CTS 3.2.J Applicability requires the Feedwater Pump Trip Instrumentation to be OPERABLE in MODE 1. This Instrumentation indirectly supports maintaining MCPR above the Safety Limit; however, MCPR is not a concern below 25% RTP due to the large inherent margin that ensures the MCPR Safety Limit is not exceeded, even if a limiting transient occurs. Therefore, the ITS 3.3.2.2 Applicability has been modified to require the instrumentation to be OPERABLE when THERMAL POWER is ≥ 25% RTP, and the current shutdown action specified in Table 3.2.J-1 Action 90.b has been changed to only require power to be reduced to < 25% RTP (ITS 3.3.2.2 Required Action B.2). In addition, the time to achieve this power level has been reduced from 8 hours to 4 hours, which is consistent with the time provided to exit the Applicability in CTS 3.11.C, MCPR, and BWR ISTS, NUREG-1433, Rev. 1, and is within the ability of the plant to achieve this condition in a safe manner.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.2 CTS Table 3.2.J-1 Action 90.b requires reduction in Thermal Power if the Feedwater Pump Trip Instrumentation is not restored to Operable status. The instrumentation indirectly supports maintaining MCPR limits during a feedwater controller failure, maximum demand event. This is accomplished by tripping the main turbine, with the main turbine trip resulting in a subsequent reactor scram. When the instrumentation is inoperable solely due to an inoperable feedwater pump breaker, the unit can continue to operate with the feedwater pump removed from service (Quad Cities 1 and 2 has three 50% capacity feedwater pumps). Therefore, an additional Required Action is proposed, ITS 3.3.2.2, Required Action B.1, to allow removal of the associated feedwater pump(s) from service in lieu of reducing Thermal Power. This Required Action will only be used if the instrumentation is inoperable solely due to an inoperable feedwater pump breaker, as stated in the Note to ITS 3.3.2.2 Required Action B.1. Since this Required Action accomplishes the functional purpose of the Feedwater System/Main Turbine High Water Level Trip Instrumentation, enables continued operation in a previously approved condition, and still supports maintaining MCPR above limits (since the reactor scram is the result of a turbine trip signal, which is not impacted by this change), this change does not have a significant effect on safe operation.

RELOCATED SPECIFICATIONS

None

3.2 - LIMITING CONDITIONS FOR OPERATION

LCO 3.3.3.1 **F. Accident Monitoring**

The accident monitoring instrumentation CHANNEL(s) shown in Table 3.2.F-1 shall be OPERABLE.

APPLICABILITY:

As shown in Table 3.2.F-1.

ACTION:

ACTION A-F

With one or more of the required number of accident monitoring instrumentation CHANNEL(s) inoperable, take the ACTION shown by Table 3.2.F-1.

Add proposed ACTIONS NOTE 1 L.1

Add proposed ACTIONS NOTE 2 A.2

4.2 - SURVEILLANCE REQUIREMENTS

F. Accident Monitoring

SR Note 1 Each of the required accident monitoring instrumentation CHANNEL(s) shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK and CHANNEL CALIBRATION operations for the OPERATIONAL MODE(s) and at the frequencies shown in Table 4.2.F-1.

Add proposed Note 2 L.2

Table 3.3.3.1-1

TABLE 3.2.F-1

ACCIDENT MONITORING INSTRUMENTATION

Function	INSTRUMENTATION	Required CHANNEL(s)	Minimum CHANNEL(s)	Applicable OPERATIONAL MODE(s)	ACTION	
1.	1. Reactor Vessel Pressure	2	1	1, 2	60	A, B, C, E
2.	2. Reactor Vessel Water Level	2	1	1, 2	60	A, B, C, E
3.	3 Torus Water Level	2	1	1, 2	60	A, B, C, E
9.	4. Torus Water Temperature	2	1	1, 2	60	A, B, C, E
4a	5. Drywell Pressure - Wide Range	2	1	1, 2	60	A, B, C, E
4b	6. Drywell Pressure - Narrow Range	2	1	1, 2	A,B,C,E 60	
	~~7. Drywell Air Temperature~~	~~2~~	~~1~~	~~1, 2~~	~~60~~	
8.	8. Drywell Oxygen Concentration - Analyzer and Monitor	2	1	1, 2	A,B,C,E 62	
7.	9. Drywell Hydrogen Concentration - Analyzer and Monitor	2	1	1, 2	A,B,C,E 62	
	~~10. Safety & Relief Valve Position Indicators - Acoustic & Temperature~~	~~2/valve (1 each)~~	~~1/valve~~	~~1, 2~~	~~63~~	
	~~11. (Source Range) Neutron Monitors~~	~~2~~	~~2~~	~~1, 2~~	~~60~~	
5.	12. Drywell Radiation Monitors	2	2	1, 2, ③	A,B,C,F 61	
	~~13. Torus Air Temperature~~	~~2~~	~~1~~	~~1, 2~~	~~60~~	
	~~14. Torus Pressure~~	~~2[a]~~	~~1~~	~~1, 2~~	~~60~~	

~~a This function is shared with Drywell Pressure-Wide Range and Drywell Pressure-Narrow Range.~~

A.3

a. Wide Range
b. Narrow Range

R.1

A.1

L.6

LA.3

Add proposed ITS 3.3.3.1 Function 6

M.1

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ITS 3.3.3.1

TABLE 3.2.F-1 (Continued)

ACCIDENT MONITORING INSTRUMENTATION

Add proposed ACTION B — L.3

ACTION

ACTION 60 - a. With the number of OPERABLE accident monitoring instrumentation CHANNEL(s) less than the Required CHANNEL(s) shown in Table 3.2.F-1, restore the inoperable CHANNEL(s) to OPERABLE status within 30 days ~~or be in at least HOT SHUTDOWN within the next 12 hours.~~

ACTION A

b. With the number of OPERABLE accident monitoring instrumentation CHANNEL(s) less than the Minimum CHANNEL(s) shown in Table 3.2.F-1, restore the inoperable CHANNEL(s) to OPERABLE status within 48 hours or be in at least HOT SHUTDOWN within the next 12 hours.

7 days — L.4

ACTION C

ACTIONS D and E

ACTION 61- ~~With the number of OPERABLE accident monitoring instrumentation CHANNEL(s) less than the Minimum CHANNEL(s) shown in Table 3.2.F-1, initiate the preplanned alternate method of monitoring the appropriate parameter(s) within 72 hours, and:~~

LA.1

L.5

Insert proposed ACTION A

with two required channels inoperable

a. ~~Either~~ restore ~~the inoperable~~ one required CHANNEL~~(s)~~ to OPERABLE status within 7 days of the event, or

ACTION C

b. Prepare and submit a Special Report to the Commission pursuant to Specification 6.9.B within 30 days following the event outlining the action taken, the cause of the inoperability and the plans and schedule for restoring the system to OPERABLE status.

ACTIONS B and F

A.4 moved to ITS 5.6

ACTION 62- a. With the number of OPERABLE accident monitoring instrumentation CHANNEL(s) one less than the Required CHANNEL(s) shown in Table 3.2.F-1, restore the inoperable CHANNEL(s) to OPERABLE status within 30 days ~~or be in at least HOT SHUTDOWN within the next 12 hours.~~

ACTION A

b. With the number of OPERABLE accident monitoring instrumentation CHANNEL(s) less than the Minimum CHANNEL(s) shown in Table 3.2.F-1; restore at least one inoperable CHANNEL to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours.

ACTION C

ACTIONS D and E

A.1

ITS 3.3.3.1

TABLE 3.2.F-1 (Continued)

ACCIDENT MONITORING INSTRUMENTATION

R.1

~~ACTION 63 -~~

~~a. With the number of OPERABLE accident monitoring instrumentation CHANNEL(s) less than the Required CHANNEL(s) shown in Table 3.2.F-1, restore the inoperable CHANNEL(s) to OPERABLE status prior to startup from a COLD SHUTDOWN of longer than 72 hours.~~

~~b. With the number of OPERABLE accident monitoring instrumentation CHANNEL(s) less than the Minimum CHANNEL(s) shown in Table 3.2.F-1, restore at least one of the inoperable CHANNEL(s) to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours.~~

A.1

Table 3.3.3.1-1

TABLE 4.2.F-1

ACCIDENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Function	INSTRUMENTATION	SR 3.3.3.1.1 CHANNEL CHECK	SR 3.3.3.1.2 SR 3.3.3.1.3 CHANNEL CALIBRATION	Applicable OPERATIONAL MODE(s)
1	1. Reactor Vessel Pressure	M - 1	3 - E	1, 2
2	2. Reactor Vessel Water Level ← a. Wide Range b. Narrow Range A.3	M - 1	3 - E	1, 2
3	3 Torus Water Level	M - 1	3 - E LE.1	1, 2
9	4. Torus Water Temperature	M - 1	3 - E	1, 2
4a	5. Drywell Pressure - Wide Range	M - 1	3 - E LD.1	1, 2
4b	6. Drywell Pressure - Narrow Range	M - 1	E	1, 2
	~~7. Drywell Air Temperature~~	~~M~~	~~E~~	~~1, 2~~ R.1
8	8. Drywell Oxygen Concentration - Analyzer and Monitor	M - 1	Q - 2	1, 2
7	9. Drywell Hydrogen Concentration - Analyzer and Monitor	M - 1	Q - 2	1, 2
	~~10. Safety & Relief Valve Position Indicators - Acoustic & Temperature~~	~~M~~	~~E~~	~~1, 2~~ R.1
	~~11. (Source Range) Neutron Monitors~~	~~M~~	~~E(a)~~	~~1, 2~~
5	12. Drywell Radiation Monitors	1 - M LD.1	LE.1 E - 3 LA.2	1, 2, 8 L.6
	~~13. Torus Air Temperature~~	~~M~~	~~E~~	~~1, 2~~ R.1
	~~14. Torus Pressure~~	~~M~~	~~E~~	~~1, 2~~ LA.3

Add proposed ITS 3.3.3.1 Function 6 M.1

ITS 3.3.3.1

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A.1

TABLE 4.2.F-1 (Continued)

ACCIDENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATION

(a) ~~CHANNEL CALIBRATION shall consist of an electronic calibration of the CHANNEL, not including the detector, for range decades above 10 R/hr and a one point calibration check of the detector below 10 R/hr with an installed or portable gamma source.~~ LA.2

(b) ~~Neutron detectors may be excluded from the CHANNEL CALIBRATION.~~ R.1

ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 This proposed change to CTS 3.2.F Action provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3, "Completion Times," the ITS 3.3.3.1 ACTIONS Note ("Separate Condition entry is allowed for each....") and the wording for ITS 3.3.3.1 ACTIONS A and C ("one or more Functions with...") provides direction consistent with the intent of the existing Action for an inoperable accident monitoring instrumentation channel. It is intended that each Function is allowed certain times to complete the Required Actions. Since this change only provides more explicit direction of the current interpretation of the existing specifications, this change is considered administrative.

A.3 CTS Table 3.2.F-1 for PAM instrumentation requires two Reactor Vessel Water Level channels to be OPERABLE (Instrument 2). ITS Table 3.3.3.1-1 Function 2 requires two wide range channels (Function 2.a) and two narrow range channels (Function 2.b). The wide range channels cover a range from approximately 202 inches above the top of active fuel to approximately 198 inches below the top of active fuel while the narrow range channels measure from approximately 82 inches above the top of active fuel to approximately 202 inches above the top of active fuel. These two ranges will cover the required range for accident monitoring as indicated in the ComEd response to Regulatory Guide 1.97 for Quad Cities 1 and 2, dated November 10, 1988. Since the proposed presentation of these Functions reflects the current interpretation of the licensing requirements, this change is considered administrative in nature.

A.4 The details concerning the technical content of the Special Report specified in CTS Table 3.2.F-1 Action 61b are being moved to Chapter 5 of the ITS in accordance with the format of the BWR ISTS, NUREG-1433, Rev. 1. Any technical changes to this requirement are addressed in the Discussion of Changes for ITS: 5.6.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS 3/4.2.F is revised to incorporate requirements for an additional PAM Instrumentation Function for Penetration Flow Path Primary Containment Isolation Valve (PCIV) Position (ITS Table 3.3.3.1-1, Function 6). This Function is included in accordance with NUREG-1433 guidelines to include all Regulatory Guide 1.97 Category 1 instruments. Penetration Flow Path PCIV Position is a Category 1 instrument for Quad Cities 1 and 2. This change represents an additional restriction on plant operation.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The use of alternate methods of monitoring in CTS Table 3.2.F-1 ACTION 61 are to be relocated to the Bases. These details are not necessary to be included in Technical Specifications to ensure actions are taken to initiate the preplanned alternate method of monitoring since ITS 3.3.3.1 Condition F requires action to be immediately initiated in accordance with ITS 5.6.6. ITS 5.6.6 requires a report to be submitted to the NRC within the following 14 days and that the report outline the preplanned alternate method of monitoring. As such, the relocated details are not required to be in Technical Specifications to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the Technical Specifications.

LA.2 The detail of the method from performing the CHANNEL CALIBRATION specified in CTS Table 4.2.F-1 footnote (a) is to be relocated to the Bases. The requirement proposed to be relocated is a procedural detail that is not necessary to be included in the Technical Specifications to ensure the OPERABILITY of the instruments. The Surveillance Requirements of ITS 3.3.3.1 provide adequate assurance the specified instruments are maintained OPERABLE. As a result, the relocated detail is not required to be included in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the Technical Specifications.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

LA.3 The details associated with the requirements of the Torus Pressure Function in CTS Table 3.2.F-1 (and Footnote a) and Table 4.2.F-1 are proposed to be relocated to the Bases. Footnote a specifies that this function is shared with Drywell Pressure-Wide Range and Drywell Pressure-Narrow Range channels. Quad Cities originally identified the torus pressure variable as a Type A variable although the parameter was not identified in the Regulatory Guide. In the Quad Cities 1 and 2 SER, "Conformance of Post Accident Monitoring Instrumentation at Quad Cities with Regulatory Guide 1.97," dated August 16, 1988, the torus pressure variable is addressed as an exception to the Regulatory Guide and the use of drywell pressure instrumentation to monitor the variable is accepted since vacuum breakers will maintain torus pressure within 0.5 psig of drywell pressure. ITS 3.3.3.1 addresses the instrumentation necessary to monitor selected post accident variables to ensure their continued Operability. Since the instrumentation used to monitor the parameter (drywell pressure - wide range and narrow range) is already included in ITS 3.3.3.1 and therefore OPERABILITY assured or appropriate actions prescribed, listing the torus pressure variable in ITS 3.3.3.1 is redundant and unnecessary. This change involves no design change and does not change the specification requirements since the instrumentation to monitor the torus pressure variable is monitored by the drywell pressure instrumentation. This is a design detail that is not necessary to include in the Technical Specifications to ensure the OPERABILITY of the PAM Instrumentation, since the OPERABILITY requirements are adequately addressed in ITS 3.3.3.1 and the Surveillance Requirements. Therefore, the relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LD.1 The Frequency for performing the CHANNEL FUNCTIONAL TEST portion of the CHANNEL CALIBRATION Surveillance of CTS 4.2.F (proposed SR 3.3.3.1.3) for CTS Post Accident Monitoring Instrumentation Functions retained in the ITS, except for CTS Instruments 8 and 9 has been extended from 18 months to 24 months. The proposed change will allow this Surveillance to extend its Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd) proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that this test normally passes its Surveillance at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. Extending the Surveillance Test interval is acceptable since the PAM Instrumentation Channels are designed to be single failure proof and because the PAM Instrumentation is verified to be operating properly throughout the operating cycle by the performance of CHANNEL CHECKS. This testing ensures that a significant portion of the PAM circuitry is operating properly and will detect significant failures of this circuitry.

Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequency, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) does not invalidate any assumptions in the plant licensing basis.

LE.1 The Frequency for performing the CHANNEL CALIBRATION Surveillances of CTS 4.2.F (proposed SR 3.3.3.1.3) for all Post Accident Monitoring Instrumentation Functions retained in the ITS except for Instruments 8 and 9 (ITS Table 3.3.3.1-1 Functions 8 and 7, respectively) has been extended from 18 months to 24 months. The proposed change will allow this Surveillance to extend the Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). The CHANNEL CALIBRATION Surveillance is performed to ensure that the indication is accurate to provide the required safety function. Extending the SR Frequency is acceptable because the PAM instruments are designed to be single failure proof and highly reliable.

Furthermore, the impacted PAM instrumentation has been evaluated based on make, manufacturer and model number to determine that the instrumentation's actual drift falls within acceptable allowances as determined by quantitative or

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) qualitative analysis. The following paragraphs, listed by CTS Instrument number, identify by make, manufacturer and model number the drift evaluations performed:

Instrument 1, Reactor Vessel Pressure

This function is performed by Rosemount 1153GB9 Transmitters, Yokogawa 4263 recorders (Unit 1), and Yokogawa 180 indicators. The Yokogawa recorder and indicator were evaluated utilizing a qualitative analysis (i.e., engineering judgment). Furthermore, the Rosemount transmitters will be evaluated (by qualitative analysis) to verify that drift for normal operating conditions is consistent with similar plant instruments used for protective functions. For operation in a harsh environment, drift is an insignificant contributor to overall loop accuracy and is not considered as an impact to proper operation. Changes will be made, as necessary, to equipment or procedures to ensure proper operation for a 24 month fuel cycle surveillance interval.

Instrument 2, Reactor Vessel Water Level - Wide Range

This function is performed by Rosemount 1153DB5 Transmitters, Rosemount 510DU/710DU Trip Units, GE Type 180 and Yokogawa 50-180 indicators, and Yokogawa recorders. The GE and Yokogawa indicators, the Yokogawa records, and Rosemount trip unit were evaluated utilizing a qualitative analysis (i.e., engineering judgment). Furthermore, the Rosemount transmitters will be evaluated (by qualitative analysis) to verify that drift for normal operating conditions is consistent with similar plant instruments used for protective functions. For operation in a harsh environment, drift is an insignificant contributor to overall loop accuracy and is not considered as an impact to proper operation. Changes will be made, as necessary, to equipment or procedures to ensure proper operation for a 24 month fuel cycle surveillance interval.

Instrument 2, Reactor Vessel Water Level - Narrow Range

This function is performed by Yarway 4418CE Transmitters, Yarway 4487 signal converters, and Unitex 8437-4 indicators. The Yarway signal converter and Unitex indicators were evaluated utilizing a qualitative analysis (i.e., engineering judgment). Furthermore, the Yarway transmitters will be evaluated (by qualitative analysis) to verify that drift for normal operating conditions is consistent with similar plant instruments used for protective functions. For operation in a harsh environment, drift is an insignificant contributor to overall loop accuracy and is not considered as an impact to proper operation. Changes will be made, as necessary, to equipment or procedures to ensure proper operation for a 24 month fuel cycle surveillance interval.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd)

Instrument 3, Torus Water Level

This function is performed by Rosemount 1153DD5PG (Unit 1) and 1153D (Unit 2) Transmitters and Barton Model 764 transmitters, EIL instrument indicators, and Yokogawa 4262 recorders. The EIL indicators and the Yokogawa 4262 recorders were evaluated utilizing a qualitative analysis (i.e., engineering judgment). Furthermore, the Rosemount and Barton transmitters will be evaluated (by qualitative analysis) to verify that drift for normal operating conditions is consistent with similar plant instruments used for protective functions. For operation in a harsh environment, drift is an insignificant contributor to overall loop accuracy and is not considered as an impact to proper operation. Changes will be made, as necessary, to equipment or procedures to ensure proper operation for a 24 month fuel cycle surveillance interval.

Instrument 4, Torus Water Temperature

This function is performed by Conax 2SK2304 thermocouple temperature elements, Moore Industries processors, Moore Industries ASM signal converters, and Honeywell VP1312-12-B-1-BL recorders. The RTDs are non calibratable devices. The Honeywell recorders were evaluated utilizing a qualitative analysis (i.e., engineering judgment). Furthermore, the Moore Industries processors and converters will be evaluated (by qualitative analysis) to verify that drift for normal operating conditions is consistent with similar plant instruments used for protective functions. For operation in a harsh environment, drift is an insignificant contributor to overall loop accuracy and is not considered as an impact to proper operation. Changes will be made, as necessary, to equipment or procedures to ensure proper operation for a 24 month fuel cycle surveillance interval.

Instrument 5, Drywell Pressure - Wide Range

This function is performed by Rosemount 1153GB7 Transmitters, EIL Instrument Indicators, and Yokogawa Recorders. The EIL indicators and Yokogawa recorders were evaluated utilizing a qualitative analysis (i.e., engineering judgment). Furthermore, the Rosemount transmitters and the Foxboro converters will be evaluated (by qualitative analysis) to verify that drift for normal operating conditions is consistent with similar plant instruments used for protective functions. For operation in a harsh environment, drift is an insignificant contributor to overall loop accuracy and is not considered as an impact to proper operation. Changes will be made, as necessary, to equipment or procedures to ensure proper operation for a 24 month fuel cycle surveillance interval.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd)

Instrument 6, Drywell Pressure - Narrow Range

This function is performed by Rosemount 1152GP Transmitters, Sigma W7-1151 Indicators, Moore SCT isolators, and Rochester Instrument PTA-215H6 trip units. The Sigma indicators were evaluated utilizing a qualitative analysis (i.e., engineering judgment). Furthermore, the Rosemount transmitters, Moore SCT isolators, and the Rochester Instrument trip units will be evaluated (by qualitative analysis) to verify that drift for normal operating conditions is consistent with similar plant instruments used for protective functions. For operation in a harsh environment, drift is an insignificant contributor to overall loop accuracy and is not considered as an impact to proper operation. Changes will be made, as necessary, to equipment or procedures to ensure proper operation for a 24 month fuel cycle surveillance interval.

Instrument 12, Drywell Radiation (High Range)

This function is performed by General Atomic RD-23 ion chamber detectors, General Atomic RP-2CM ion detector monitors and Bailey 50-732112 recorders. The General Atomic Radiation Monitoring Instrumentation and the Bailey 732 recorders were evaluated utilizing a qualitative analysis (i.e., engineering judgment). The results of this analysis support a 24 month fuel cycle surveillance interval extension.

Based on the design of the instrumentation and the drift evaluations, it is concluded that the impact, if any, on system availability is minimal as a result of the change in the surveillance test interval.

A review of the surveillance test history was performed to validate the above conclusion. This review of the surveillance test history demonstrates that there are no failures that would invalidate the conclusion that the impact, if any, on system availability is minimal from a change to a 24-month surveillance frequency. In addition, the proposed 24-month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

"Specific"

L.1 CTS 3.0.D currently precludes a change in MODE with an accident monitoring instrumentation channel inoperable. A statement that LCO 3.0.4 is not applicable has been added as a NOTE to the ITS 3.3.3.1 ACTIONS. This Note allows entry into the applicable MODE while relying on the ACTIONS even though the ACTION may require plant shutdown. Accident monitoring instrumentation does not impact normal operation of the plant and would not provide additional initiators for plant transients during MODE changes. This exception is acceptable due to the passive function of the instrumentation, operator ability to use alternative instrumentation and methods, and the low probability of an event occurring that would require the instruments.

L.2 A Note has been added to CTS 4.2.F (ITS 3.3.3.1 Note 2 to the Surveillance Requirements) to allow a channel to be inoperable for up to 6 hours solely for performance of required Surveillances provided the other channel in the associated Function is OPERABLE. The 6 hour testing allowance has been granted by the NRC in TS amendments for Georgia Power Company's Hatch Unit 1 (amendment 185) and Unit 2 (amendment 125), Washington Public Power Supply System's WNP-2 (amendment 149, the ITS amendment), and Nine Mile Point Unit 2 (amendment 91, the ITS amendment). The NRC has also granted this allowance in other topical reports for the Reactor Protection System, Emergency Core Cooling System, and isolation equipment. The 6 hour testing allowance does not significantly reduce the probability of properly monitoring post-accident parameters, when necessary, since the other channel must be OPERABLE for this allowance to be used.

L.3 CTS Table 3.2.F-1 ACTIONS 60a and 62a, for one channel inoperable in one or more Functions for more than the allowed outage time is revised from requiring a shutdown to requiring a Special Report (ITS 3.3.3.1 Required Action B.1) in accordance with the Administrative Control section of the Technical Specifications. Due to the passive function of these instruments and the operator's ability to respond to an accident utilizing alternate instruments and methods for monitoring, it is not appropriate to impose stringent shutdown requirements for out of service instrumentation. The change is considered acceptable since another OPERABLE channel is monitoring the Function and the probability of an event, requiring the operator to utilize this instrumentation to respond to the event, is low. This change is consistent with the BWR ISTS, NUREG-1433, Rev. 1.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.4 The CTS Table 3.2.F-1 ACTION 60b allowable outage time for restoration of two inoperable monitors is revised from 48 hours to 7 days in proposed ITS 3.3.3.1 Required Action C.1. Due to the passive nature of these instruments and the operator's ability to respond to an accident utilizing alternate instruments and methods of monitoring, it is not appropriate to impose stringent shutdown requirements for out-of-service instrumentation. The change is considered acceptable since an alternate method of monitoring the Function is available and the probability of an event, requiring the operator to utilize this instrumentation to respond to the event, is low. This change is consistent with BWR ISTS, NUREG-1433, Rev. 1.

L.5 CTS Table 3.2.F-1 ACTION 61 is changed for one or two drywell area radiation monitors inoperable. With one monitor inoperable, ITS 3.3.3.1 Required Action A.1 provides 30 days for the restoration of the monitor prior to initiating the alternate method of monitoring. With two monitors inoperable, ITS 3.3.3.1 Required Action C.1 provides 7 days for restoration of one monitor prior to initiating the alternate method of monitoring. With one or two monitors inoperable CTS Table 3.2.F-1 ACTION 61 requires initiation of the alternate method of monitoring within 72 hours and restoration of both channels to OPERABLE status within 7 days. The Completion Times (30 days when one monitor is inoperable or 7 days when two monitors are inoperable) for restoration of one channel or initiation of the alternate method of monitoring is considered acceptable based on the relatively low probability of an event requiring PAM instrumentation, the passive function of the instruments, the availability of the redundant monitor (for the condition of one monitor inoperable), and the availability of alternate means to obtain the information.

L.6 CTS Table 3.2.F-1 and Table 4.2.F-1 Applicability requirement for Drywell Area Radiation Monitors, during MODES 1, 2, and 3 is proposed to be changed to MODES 1 and 2. Proposed ITS 3.3.3.1 Applicability requires PAM instrumentation only in MODES 1 and 2. These instruments should not be required in MODE 3 because they are required to monitor variables related to the diagnosis and preplanned actions required to mitigate design basis accidents occurring in MODES 1 and 2. In MODES 3, 4, and 5, plant conditions are such that the likelihood of an event that would require PAM instrumentation is extremely low. Therefore, the PAM instrumentation is not required to be OPERABLE in MODES 3, 4, and 5. This change is consistent with BWR ISTS, NUREG-1433, Revision 1.

RELOCATED SPECIFICATIONS

R.1 Drywell Air Temperature, Safety Relief Valve Position Indicators, Source Range Neutron Monitors, and Torus Air Temperature (CTS Table 3.2.F-1 Functions 7, 10, 11, and 13, respectively) are not credited as Category 1 or Type A variables as summarized in the Section 7.5.1 of the UFSAR. Further, the loss of these instruments is a non-significant risk contributor to core damage frequency and offsite release. Therefore, the requirements specified for these Functions do not satisfy the NRC Policy Statement Technical Specification screening criteria as documented in the Application of Selection Criteria to the Quad Cities 1 and 2 Technical Specifications and have been relocated to the Technical Requirements Manual (TRM). The TRM will be incorporated by reference into the Quad Cities 1 and 2 UFSAR at ITS implementation. Changes to the TRM will be controlled in accordance with 10 CFR 50.59.

ITS 3.3.4.1

A.1

3.2 - LIMITING CONDITIONS FOR OPERATION

C. ATWS - RPT

LCO 3.3.4.1

The anticipated transient without scram recirculation pump trip (ATWS - RPT) instrumentation CHANNEL(s) shown in Table 3.2.C-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the ~~Trip Setpoint~~ Allowable Value A.4 column.

APPLICABILITY:

OPERATIONAL MODE 1.

ACTION:

add proposed ACTIONS Note A.2

ACTIONS A, B, and C

1. With an ATWS - RPT instrumentation CHANNEL trip setpoint less conservative than the value shown in the ~~Trip Setpoint~~ Allowable Value A.4 column of Table 3.2.C-1, declare the CHANNEL inoperable until the CHANNEL is restored to OPERABLE status with the CHANNEL trip setpoint ~~adjusted~~ consistent with the ~~Trip Setpoint~~ value.

ACTION A

2. With one level CHANNEL or one pressure CHANNEL inoperable ~~in one or both~~ TRIP SYSTEM(s), within 14 days, either restore the inoperable CHANNEL to OPERABLE status or place the inoperable CHANNEL in the tripped condition[a]. M.1

add proposed Required Action A.2 Note M.2

add proposed Required Action D.1 L.1

ACTION D

Otherwise, be in STARTUP within the next 6 hours.

ACTION A

3. With two level CHANNELS or two pressure CHANNELS inoperable ~~in one or both TRIP SYSTEM(s), declare the TRIP SYSTEM(s) inoperable.~~ L.2

4.2 - SURVEILLANCE REQUIREMENTS

C. ATWS - RPT

SR 3.3.4.1.1 through SR 3.3.4.1.4

1. Each ATWS - RPT instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.2.C-1.

SR 3.3.4.1.5

2. LOGIC SYSTEM FUNCTIONAL TEST(s) of all CHANNEL(s) shall be performed including breaker actuation M.1 at least once per ~~18~~ 24 LA.1 months.

LA.1

~~[a] The inoperable CHANNEL(s) need not be placed in the tripped condition where this would cause the Trip Function to occur.~~

Page 1 of 5

3.2 - LIMITING CONDITIONS FOR OPERATION **4.2 - SURVEILLANCE REQUIREMENTS**

4. With one level CHANNEL and one pressure CHANNEL inoperable in one or both TRIP SYSTEM(s), restore at least one inoperable CHANNEL to OPERABLE status within 14 days or be in STARTUP within the next 6 hours.

M.1

ACTION A

ACTION D

L.3

Function

5. With one TRIP SYSTEM inoperable, restore the inoperable TRIP SYSTEM to OPERABLE status within 72 hours or be in at least STARTUP within the next 6 hours.

ACTION B

ACTION D

L.3

Functions

L.L

add proposed Required Action D.1

6. With both TRIP SYSTEM(s) inoperable, restore at least one TRIP SYSTEM to OPERABLE status within one hour or be in at least STARTUP within the next 6 hours.

ACTION C

ACTION D

Page 2 of 5

A.1

TABLE 3.2.C-1

ATWS - RPT INSTRUMENTATION

Allowable Values — A.4

Note to Surveillance Requirements

	Functional Unit	~~Trip Setpoint~~[(b)]	Minimum OPERABLE CHANNEL(s) per TRIP SYSTEM(a)
LCO 3.3.4.1.a	1. Reactor Vessel Water Level - Low Low	SR 3.3.4.1.4.a ≥84 inches[(c)]	LCO 3.3.4.1 2
LCO 3.3.4.1.b	2. Reactor Vessel Pressure - High	SR 3.3.4.4.b ≤1250 psig	2

Steam Dome

LF.1

Insert CTS 3.2.C-1 Note a — A.3

---

a ~~A CHANNEL may be placed in an inoperable status for up to 2 hours for required surveillance without placing the TRIP SYSTEM in the tripped condition provided at least one OPERABLE CHANNEL in the same TRIP SYSTEM is monitoring that parameter.~~

b Includes a time delay of 8 ≤ t ≤ 10 seconds.

c ~~Reactor vessel water level settings are expressed in inches above the top of active fuel (which is 360 inches above vessel zero).~~

SR 3.3.4.1.4.a

LA.2

Page 3 of 5

ITS 3.3.4.1

~~Insert 12, Page 3/4.2-23~~ A3 Insert CTS 3.2C-1 Note a ITS 3.3.4.1

When a CHANNEL is placed in an inoperable status solely for performance of required Surveillances, entry into associated Limiting Conditions for Operation and required ACTIONs may be delayed for up to 6 hours provided the Functional Unit maintains ATWS ~~actuation~~ trip capability.

Note to Surveillance Requirements

ITS 3.3.4.1

A.1

TABLE 4.2.C-1

ATWS - RPT INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Functional Unit	SR 3.3.4.1.1 CHANNEL CHECK	SR 3.3.4.1.3 CHANNEL FUNCTIONAL TEST	SR 3.3.4.1.2 SR 3.3.4.1.4 CHANNEL CALIBRATION
LCO 3.3.4.1.a 1. Reactor Water Level - Low Low	S - 1	A.3 M Q - 3	4 - E[a] - 2
LCO 3.3.4.1.b 2. Reactor Vessel Pressure - High	S - 1	M Q - 3	4 - E[a] - 2

24 months

LE.1

SR 3.3.4.1.2
SR 3.3.4.1.4

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a Trip units are calibrated at least once per 31 days and transmitters are calibrated at the frequency identified in the table.

Page 5 of 5

ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 This proposed change to the CTS 3.2.C Actions provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3, "Completion Times," the ITS 3.3.4.1 ACTIONS Note ("Separate Condition entry is allowed for each....") provides direction consistent with the intent of the existing Actions for an inoperable ATWS-RPT instrumentation channel. It is intended that each inoperable channel is allowed a certain time to complete the Required Actions. Since this change only provides more explicit direction of the current interpretation of the existing specifications, this change is considered administrative.

A.3 These changes to CTS 3/4.2.C are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per Com Ed letter dated December 27, 1999. The changes identified are consistent with the allowances in GENE-770-06-1-A, "Bases for Changes To Surveillance Test Intervals and Allowed Out-of-Service Times For Selected Instrumentation Technical Specifications," December 1992, which has been approved by the NRC. As such, this change is considered administrative.

A.4 CTS 3.2.C requires the ATWS-RPT instrumentation setpoints to be set consistent with the Trip Setpoint values shown in Table 3.2.C-1. The CTS 3.2.C Action requires the CHANNEL to be declared inoperable when the setpoint is less conservative than the value shown in the Trip Setpoint column of Table 3.2.C-1. Table 3.2.C-1 includes a "Trip Setpoint" column. It is proposed to re-label this column as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1 (ISTS Table 3.3.4.1-1). In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS Table 3.2.C-1 are applied as the Operability limits for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual

ADMINISTRATIVE

A.4 (cont'd) trip setpoints specified in CTS Table 3.2.C-1 for the ATWS-RPT instrumentation Functions or the Allowable Values specified in ITS 3.3.4.1 (see Discussion of Change LF.1 below for proposed changes to the trip setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 The ATWS trip logic uses a two-out-of-two logic for each trip Function in both trip systems. The reactor recirculation pumps will trip when one trip system actuates. Therefore, when a channel associated with one Trip Function (e.g., Reactor Water Level - Low Low) is inoperable in both trip systems, the ATWS-RPT trip capability is lost for that Function. Similarly, if channels associated with both Trip Functions are inoperable in both trip systems, the ATWS-RPT trip capability is lost for both ATWS-RPT trip Functions. CTS 3.2.C Action 2 and 4 address the condition with channels inoperable in both trip systems. Under these conditions the ATWS-RPT trip capability is lost for one and two Trip Functions, respectively. In the ITS, these conditions will require entry into proposed ITS 3.3.4.1 ACTION B and ACTION C, respectively. The Completion Times (72 hours and 1 hour, respectively) are consistent with the current actions for loss of trip function capability in CTS 3.2.C Actions 5 and 6, respectively. Since the current allowances have been deleted, this change is considered more restrictive on plant operations but necessary to limit the time the plant is allowed to operate with a loss of trip capability.

M.2 If the channels are inoperable due to a trip breaker that will not open, placing the channels in the tripped condition, as required by CTS 3.2.C Action 2 will not accomplish the intended restoration of the functional capability. Therefore, a Note is added to ITS 3.3.4.1 Required Action A.2 to prevent proposed Required Action A.2 (place channel in trip) from being used in these conditions. This new Note will ensure the functional capability of the ATWS-RPT is restored (by restoring the inoperable channel) within the allowed Completion Time when a trip breaker is inoperable. In addition, the LOGIC SYSTEM FUNCTIONAL TEST in CTS 4.2.C.2 (proposed ITS SR 3.3.4.1.5) has been revised to include breaker actuation. This added requirement will ensure the complete testing of the assumed function. These changes are more restrictive on plant operation and necessary to ensure that ATWS-RPT Functions are adequately maintained.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The details in CTS 3.2.C Action footnote a, relating to placing channels in trip, are proposed to be relocated to the Bases. The ACTIONS of ITS 3.3.4.1 ensure inoperable channels are placed in trip or the unit is placed in a non-applicable MODE or condition, as appropriate. In addition, the Bases for Required Actions A.1 and A.2 indicate that the channels are not required to be placed in the trip condition, and directs entry into the appropriate Condition. As a result, these relocated details are not necessary for ensuring the appropriate actions are taken in the event of inoperable ATWS-RPT Instrumentation channels. As such, these relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LA.2 The detail in CTS Table 3.2.C-1 Note (c) related to the reference setting of the reactor vessel water level instrumentation is proposed to be relocated to the UFSAR. This detail is not necessary to ensure the OPERABILITY of the ATWS-RPT instrumentation. The requirements of ITS 3.3.4.1 and the Surveillances are adequate to ensure the ATWS-RPT reactor vessel water level instrumentation is maintained OPERABLE. Therefore, this relocated detail is not required to be in the ITS to provide adequate protection of public health and safety. Changes to the UFSAR will be controlled by the provisions of 10 CFR 50.59.

LD.1 The Frequency for performing the LOGIC SYSTEM FUNCTIONAL TEST of CTS 4.2.C.2 (proposed SR 3.3.4.1.5) has been extended from 18 months to 24 months. This SR ensures that ATWS-RPT System will function as designed to ensure proper response during an analyzed event. The proposed change will allow this Surveillance to extend the Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd) this test normally passes the Surveillance at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. Extending the SR interval for this function is acceptable because the ATWS-RPT logic is tested every 92 days by the Channel Functional Test in CTS 4.2.C.1 and Table 4.2.C-1 (proposed SR 3.3.4.1.3). This testing of the ATWS-RPT System ensures that a significant portion of the circuitry is operating properly and will detect significant failures of this circuitry. The ATWS-RPT System including the actuating logic is designed to be single failure proof and therefore, is highly reliable. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the above discussion, the impact, if any, of this change on system availability is minimal. This historical review of the surveillance test history demonstrates that there are no failures that would invalidate the conclusion that the impact, if any, on system availability is small from a change to a 24 month operating cycle. In addition, the proposed 24 month Surveillance Frequency, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) does not invalidate any assumptions in the plant licensing basis.

LE.1 The Frequency for performing the CHANNEL CALIBRATION Surveillance of CTS 4.2.C.1 and Table 4.2.C-1 Trip Functions 1 and 2 (proposed SR 3.3.4.1.4) has been extended from 18 months to 24 months. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. The CHANNEL CALIBRATION Surveillance is performed to ensure that a previously evaluated setpoint actuation takes place to provide the required safety function. Extending the SR Frequency is acceptable because the ATWS-RPT initiation logic is designed to be single failure proof, and therefore, is highly reliable. Furthermore, the impacted ATWS-RPT instrumentation has been evaluated based on make, manufacturer and model number to determine that the instrumentation's actual drift falls within the design allowance in the associated setpoint calculation. The following paragraphs, listed by CTS Functional Unit, identify by make, manufacturer and model number the drift evaluations performed:

Functional Unit 1, Reactor Vessel Water Level - Low Low

This function is performed by Rosemount 1151DP4 Transmitters, Amerace ETR14B3CC2004003 time delay relays, and General Electric Model 184C5988G131 Analog Trip Units. The General Electric Analog Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the General Electric Analog Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 2, Reactor Vessel Pressure - High

This function is performed by Rosemount 1151GP9 Transmitters and General Electric Model 184C5988G131 Trip Units (existing Rosemount trip units scheduled for replacement with the General Electric Trip Units during Q1R16 for Unit 1). The General Electric Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the General Electric Analog Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) Based on the design of the instrumentation and the drift evaluations, it is concluded that the impact, if any, on system availability is minimal as a result of the change in the surveillance test interval.

A review of the surveillance test history was performed to validate the above conclusion. This review of the surveillance test history, demonstrates that there are no failures that would invalidate the conclusion that the impact, if any on system availability is minimal from a change to a 24-month surveillance frequency. In addition, the proposed 24-month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

L.1 CTS 3.2.C Actions 2, 4, 5 and 6 require the unit to be placed in Startup (Mode 2) within 6 hours if the ATWS-RPT instrumentation is not restored within the allowed out-of-service times. The purpose of the ATWS-RPT instrumentation is to trip the recirculation pumps. Therefore, an additional Required Action is proposed, ITS 3.3.4.1 Required Action D.1, to allow removal of the associated recirculation pump breaker(s) from service in lieu of being in MODE 2 within 6 hours. Since this action accomplishes the functional purpose of the ATWS-RPT instrumentation and enables continued operation in a previously approved condition, this change does not have a significant effect on safe operation.

L.2 CTS 3.2.C Action 3 requires the associated Trip System to be declared inoperable when two reactor vessel water level channels or two reactor vessel pressure channels in the same Trip System are inoperable in one or two trip systems. Declaring the Trip System inoperable would require restoration of the inoperable channels, as required by CTS 3.2.C Action 5 or 6. Placing the inoperable channels in trip is not allowed as an option. ITS 3.3.4.1 Required Action A.1 provides an option to place all inoperable channels in the tripped condition. This conservatively compensates for the inoperable status, restores the single failure capability and provides the required initiation capability of the instrumentation. Therefore, providing this option does not impact safety. However, if this action would result in system actuation, then declaring the system inoperable is the preferred action.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.3 CTS 3.2.C Action 5 requires that when one Trip System is inoperable, 72 hours are provided to restore the Trip System. CTS 3.2.C Action 6 requires that when both Trip Systems are inoperable, 1 hour is provided to restore one Trip System. As described in CTS 3.2.C Action 3, a Trip System is inoperable when two channels of the same Function (i.e., reactor vessel water level or reactor vessel pressure) are inoperable in the Trip System. ITS 3.3.4.1 ACTION B addresses trip Function capability, not Trip System capability. A trip Function is maintained when sufficient channels are Operable or in trip, such that the ATWS-RPT System will generate a trip signal from the given Function on a valid signal and both recirculation pumps can be tripped. This requires two channels of the Function, in the same trip system, to each be Operable or in trip. The following is a description of the manner in which the ITS is applied, relative to the CTS.

a) When a single Trip System is inoperable under the CTS requirements, either due to two inoperable reactor vessel water level channels or two inoperable reactor vessel pressure channels, or both, the ITS will not have an inoperable Function. Therefore, ITS 3.3.4.1 ACTION A would apply, which allows 14 days to restore channels. This is consistent with the CTS 3.2.C Action 2 and Action 4 time. While in this condition, the ATWS-RPT System is still capable of tripping both recirculation pumps on either Function. In addition, two similar channels inoperable is functionally equivalent to one channel inoperable (which the CTS allows in Action 2) after the change described in Discussion of Change M.1 above; the Trip System will not provide a trip signal from the given Function.

b) When both Trip Systems are inoperable under the CTS requirements due to two channels of the same Function being inoperable in both Trip Systems, 1 hour is allowed by CTS 3.2.C Action 6 to restore one of the Trip Systems (by restoring the channels in the Trip System). In the ITS, when two channels of the same Function are inoperable in both Trip Systems, one function will be inoperable. Therefore, ITS 3.3.4.1 ACTION B would apply, which allows 72 hours to restore the inoperable channels. This is acceptable since while in this condition, the ATWS-RPT System is still capable of tripping both recirculation pumps on the other Function and operator action can still be taken to trip the recirculation pumps during this beyond design basis event. In CTS 3.2.C Action 3, this same condition requires entry into CTS 3.2.C Action 6 where only one hour is provided to restore one Trip System to Operable status.

TECHNICAL CHANGES - LESS RESTRICTIVE

L.3 (cont'd)

c) When both Trip Systems are inoperable under the CTS requirements due to two channels of one Function being inoperable in one Trip System and two channels of the other Function being inoperable in the other Trip System, the ITS will not have an inoperable Function. Therefore, ITS ACTION A would apply, which allows 14 days to restore channels. In CTS 3.2.C Action 3, this same condition requires entry into CTS 3.2.C Action 6 where only one hour is provided to restore one Trip System to Operable status. This is acceptable since while in this condition, the ATWS-RPT System is still capable of tripping both recirculation pumps on either Function. In addition, when one channel is inoperable, the associated Function (either Reactor Vessel Steam Dome Pressure — High or Reactor Vessel Water Level — Low Low) cannot actuate the Trip System, since both channels of a Function must trip to actuate the Trip System (i.e., each Trip System is a two-out-of-two logic for each Function). This condition is covered by CTS 3.2.C Action 2. When two channels of the same Function are inoperable in a Trip System, this condition is functionally equivalent to that covered by CTS 3.2.C Action 2 (i.e., one channel inoperable). That is, with both channels of the same Function inoperable in a Trip System, the associated Function cannot actuate the Trip System, identical to the results when one channel is inoperable in a Trip System.

d) When both Trip Systems are inoperable under the CTS requirements due to all channels of both Functions inoperable in both Trip Systems, the ITS will have two inoperable Functions. Therefore, ITS 3.3.4.1 ACTION C would apply, which allows 1 hour to restore channels. This is consistent with the CTS Action 6 time.

RELOCATED SPECIFICATIONS

None

A.1

3.2 - LIMITING CONDITIONS FOR OPERATION

B. Emergency Core Cooling Systems (ECCS) Actuation

LCO 3.3.5.1 The ECCS actuation instrumentation CHANNEL(s) shown in Table 3.2.B-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the ~~Trip Setpoint~~ Allowable Value A.2 column.

APPLICABILITY:

As shown in Table 3.2.B-1.

ACTION: add proposed ACTIONS Note A.3

1. ACTION A With an ECCS actuation instrumentation CHANNEL trip setpoint less conservative than the value shown in the ~~Trip Setpoint~~ Allowable Value A.2 column of Table 3.2.B-1, declare the CHANNEL inoperable until the CHANNEL is restored to OPERABLE status with its trip setpoint adjusted consistent with the ~~Trip Setpoint~~ value.

2. ACTION A With one or more ECCS actuation instrumentation CHANNEL(s) inoperable, take the ACTION required by Table 3.2.B-1.

A.8

3. ~~With either ADS TRIP SYSTEM inoperable, restore the inoperable TRIP SYSTEM to OPERABLE status within:~~

   a. ~~7 days provided that both the HPCI and RCIC systems are OPERABLE, or~~

   b. ~~72 hours.~~

   ~~With the above provisions of this ACTION not met, be in at least HOT~~

4.2 - SURVEILLANCE REQUIREMENTS

B. ECCS Actuation

1. Note 1 to Surveillance Requirements Each ECCS actuation instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL MODE(s) and at the frequencies shown in Table 4.2.B-1.

2. SR 3.3.5.1.8 LOGIC SYSTEM FUNCTIONAL TEST(s) of all CHANNEL(s) shall be performed at least once per ~~18~~ 24 months. L.D.1

SHUTDOWN within the next 12 hours and reduce reactor steam dome pressure to ≤150 psig within the following 24 hours.

A.8

A.1

ITS 3.3.5.1

3.3.5.1-1

TABLE 3.2.B-1

EMERGENCY CORE COOLING SYSTEMS ACTUATION INSTRUMENTATION

M.1 — add Core Spray Pump Start - Time Delay Relay (Function 1.e)

A2 — Allowable Value — LA.1

Note 2 to Surveillance Requirement

Note(b) to Table 3.3.5.1-1

Table 3.3.5.1-1 Note(a)

	Function Functional Unit	Trip Setpoint ⓗ	Minimum CHANNEL(s) per Trip Function ⓐ	Applicable OPERATIONAL MODE(s)	ACTION
	1. CORE SPRAY (CS) SYSTEM				
1.a	a. Reactor Vessel Water Level - Low Low ⓑ	≥84 inches	4	1, 2, 3, 4ⓒ, 5ⓒ	30 B
1.b	b. Drywell Pressure - High ⓕⓔ A.6	≤2.5 psig	4	1, 2, 3	30 B
1.c	c. Reactor Vessel Pressure - Low (Permissive)	≥300 psig & ≤350 psig	2	1, 2, 3 4ⓒ, 5ⓒ	31 C 32 B
1.d	d. CS Pump Discharge Flow - Low (Bypass)	≥500 gpm	1/loop	1, 2, 3, 4ⓒ, 5ⓒ	33 E

LF.1

≤ 874 gpm — M.2

Table 3.3.5.1 Note (a)

	2. LOW PRESSURE COOLANT INJECTION (LPCI) SUBSYSTEM				
2.a	a. Reactor Vessel Water Level - Low Low LF.1	≥84 inches	4	1, 2, 3, 4ⓒ, 5ⓒ	30 B
2.b	b. Drywell Pressure - High ⓕ A.6	≤2.5 psig	4	1, 2, 3	30 B
2.c	c. Reactor Vessel Pressure - Low (Permissive)	≥300 psig & ≤350 psig	2	1, 2, 3 4ⓒ, 5ⓒ	31 C 32 B
2.f	d. LPCI Pump Discharge Flow - Low (Bypass)	≥2400 gpm	1/loop	1, 2, 3, 4ⓒ, 5ⓒ	33 E

add proposed Functions 2.d, 2.e, 2.g, 2.h, 2.i, 2.j, and 2.k — M.1

Page 3 of 17

3.3.5.1-1

TABLE 3.2.B-1 (Continued)

Note 2 to Surveillance Requirements

ECCS ACTUATION INSTRUMENTATION

A.2 Allowable Value

LA.1

Table 3.3.5.1 Note (c)

A.1

	Functional Unit	~~Trip Setpoint~~(n)	Minimum CHANNEL(s) per Trip Function(a)	Applicable OPERATIONAL MODE(s)	ACTION
	3. HIGH PRESSURE COOLANT INJECTION (HPCI) SYSTEM(a)		LF.1		
3.a	a. Reactor Vessel Water Level - Low Low	≥84 inches	4	1, 2, 3	A.8 ~~35~~ → 37 B
3.b	b. Drywell Pressure - High(f) A.6	≤2.5 psig	4	1, 2, 3	~~35~~ → 37 B
3.d	c. Condensate Storage Tank Level - Low(e) LA.2	≥10,000 gal	2	1, 2, 3	35 D
3.e	d. Suppression Chamber Water Level - High(e)	≤14'8" above ~~bottom of chamber~~ LA.1	2	1, 2, 3	35 D
3.c	e. Reactor Vessel Water Level - High (Trip)	≤201 inches	2	1, 2, 3	31 C
3.f	f. HPCI Pump Discharge Flow - Low (Bypass)	≥600 gpm	1	1, 2, 3	33 E
3.g	g. Manual Initiation	NA	1/~~system~~ A.7	1, 2, 3	34 C
	Table 3.3.5.1 Note (c)				
	4. AUTOMATIC DEPRESSURIZATION SYSTEM - TRIP SYSTEM 'A'(a)				A.8 32
4.a	a. Reactor Vessel Water Level - Low Low	≥84 inches	2	1, 2, 3	~~30~~ F
4.b	b. Drywell Pressure - High(f) A.6	≤2.5 psig	2	1, 2, 3	~~30~~ F
4.c	c. Initiation Timer	≤120 sec	1	1, 2, 3	31 G
4.f	d. Low Low Level Timer	≤9.0 min	1	1, 2, 3	31 G
4.d	e. CS Pump Discharge Pressure - High (Permissive)	≥100 psig & ≤150 psig	2 ~~1~~/pump *	1, 2, 3	31 G
4.e	f. LPCI Pump Discharge Pressure - High (Permissive)	≥100 psig & ≤150 psig	2 ~~1~~/pump	1, 2, 3	31 G

A.8

LF.1

ITS 3.3.5.1

Page 4 of 17

A.1

3.3.5.1-1

TABLE 3.2.B-1 (Continued)

ECCS ACTUATION INSTRUMENTATION

A.2 Allowable Value

LA.1

Note 2 to Surveillance Requirements

Table 3.3.5.1 Note (c)

Functional Unit	Trip Setpoint^(h)	Minimum CHANNEL(s) per Trip Function^(d)	Applicable OPERATIONAL MODE(s)	ACTION
5. AUTOMATIC DEPRESSURIZATION SYSTEM - TRIP SYSTEM 'B'^(c)				
5.a a. Reactor Vessel Water Level - Low Low	≥84 inches	2	1, 2, 3	A.8 3B ~~30~~ F
5.b b. Drywell Pressure - High^(f) A.6	≤2.5 psig	2	1, 2, 3	~~30~~ F
5.c c. Initiation Timer	≤120 sec	1	1, 2, 3	31 G
5.f d. Low Low Level Timer	≤9.0 min	1	1, 2, 3	31 G
5.d e. CS Pump Discharge Pressure - High (Permissive)	≥100 psig & ≤150 psig	② ~~1~~/pump	1, 2, 3	31 G
5.e f. LPCI Pump Discharge Pressure - High (Permissive)	≥100 psig & ≤150 psig	② ~~1~~/pump	1, 2, 3	31 G

LF.1

A.8

	Trip Setpoint	Minimum CHANNEL(s) per Trip Function	Applicable OPERATIONAL MODE(s)	ACTION
6. LOSS OF POWER				
a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	3045 ± 152 volts decreasing voltage	2/bus	1, 2, 3, 4^(e), 5^(e)	36
b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	≥3845 volts (Unit 1)^(f)(g) ≥3845 volts (Unit 2)^(f)(g)	2/bus	1, 2, 3, 4^(e), 5^(e)	36

A.9 moved to ITS 3.3.8.1

ITS 3.3.5.1

Page 5 of 17

TABLE 3.2.B-1 (Continued)

ECCS ACTUATION INSTRUMENTATION

A.8 Insert ACTION 31

ACTION

Insert ACTION 30

~~ACTION 30 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement:~~

~~a. With one CHANNEL inoperable, place the inoperable CHANNEL in the tripped condition within one hour or declare the associated ECCS system(s) inoperable.~~

~~b. With more than one CHANNEL inoperable, declare the associated ECCS system(s) inoperable.~~

~~ACTION 31 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement:~~

~~a. For ADS, declare the associated ADS TRIP SYSTEM inoperable.~~

~~b. For CS, LPCI or HPCI, declare the associated ECCS system(s) inoperable.~~

A.13

ACTION 32 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, place the inoperable CHANNEL in the tripped condition within ~~one hour~~ 24 hours or declare associated ECCS pump inop.
ACTION B
ACTION H

A.8 Insert ACTION 33

~~ACTION 33 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, place the inoperable CHANNEL in the tripped condition within one hour; restore the inoperable CHANNEL to OPERABLE status within 7 days or declare the associated ECCS system(s) inoperable.~~

ACTION 34 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, restore the inoperable CHANNEL to OPERABLE status within ~~8~~ 24 hours or declare the associated ECCS system(s) inoperable.
ACTION C
ACTION H

A.8

Insert ACTION 35

~~ACTION 35 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, place at least one inoperable CHANNEL in the tripped condition within one hour or declare the HPCI system inoperable.~~

A.9
moved to ITS 3.3.8.1

ACTION 36 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, place the inoperable CHANNEL in the tripped condition within one hour, or declare the associated emergency diesel generator inoperable and take the ACTION required by Specification 3.9.A or 3.9.B, as appropriate.

Insert ACTION 37 and 38 A.8

A.8

Insert ACTION 30

ITS 3.3.5.1

Insert 8, Page 3/4.2-16

ACTION B

ACTION 30 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement (Action 30a only applies in OPERATIONAL MODES 1, 2 and 3):

Required Action B.1 a. Within one hour from discovery of loss of initiation capability declare the associated ECCS systems inoperable, AND

Required Action B.3 b. Place the inoperable CHANNEL(s) in the tripped condition within 24 hours or declare the associated ECCS system inoperable.

A.8

Insert Action 31

Insert 9, Page 3/4.2-16

ACTION 31 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement:

ACTION C

For CS, LPCI and HPCI (Action 31a applies only in OPERATIONAL MODES 1, 2, and 3 for Functional Units 1.c and 2.c):

a. Within one hour from discovery of loss of initiation capability declare the associated ECCS systems inoperable, AND

b. Restore the inoperable CHANNEL(s) to OPERABLE status within 24 hours or declare the associated ECCS system(s) inoperable

Action H

ACTION G

For ADS:

a. Within one hour from discovery of loss of initiation capability in both ADS trip systems, declare the ADS relief valves inoperable, AND

b. With RCIC or HPCI inoperable, restore the inoperable CHANNEL(s) to OPERABLE status within 96 hours or declare the ADS trip system(s) inoperable, AND

ACTION H

c. With RCIC and HPCI OPERABLE, restore the inoperable CHANNEL(s) to OPERABLE status within 8 days or declare the ADS trip system(s) inoperable

ACTION H

A.8

ITS 3.3.5.1

Insert ACTION 33

Insert 10, Page 3/4.2-16

ACTION 33 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement (For Functional Units 1.d and 2.d, Action 33a only applies in OPERATIONAL MODES 1, 2 and 3):

ACTION E

a. Within one hour from discovery of loss of initiation capability declare the associated ECCS system(s) inoperable, AND

b. Restore the CHANNEL(s) to OPERABLE status within 7 days or declare the associated ECCS system(s) inoperable.

ACTION H

Page 9 of 17

A.8

Insert ACTION 35

ITS 3.3.5.1

Insert 11, Page 3/4.2-16

ACTION 35 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement:

ACTION D

a. Within one hour from discovery of loss of initiation capability, declare HPCI inoperable, AND

b. Place the inoperable CHANNEL(s) in the tripped condition within 24 hours or declare the HPCI system inoperable

ACTION H

add proposed Required Action D.2.2

A.10

A.8

Insert ITS 3.3.5.1

Insert ACTION 37

Insert 12, Page 3/4.2-16

ACTION 37 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement:

ACTION B

a. Within one hour from discovery of loss of initiation capability declare HPCI inoperable, AND

Required Action B.2

b. Place the inoperable CHANNEL(s) in the tripped condition within 24 hours or declare HPCI inoperable.

Required Action B.3

A.8

ITS 3.3.5.1

Insert Action 38

INSERT 13, Page 3/4.2-16

ACTION 38 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement:

ACTION F

a. Within one hour from discovery of loss of initiation capability in both ADS trip systems, declare the ADS relief valves inoperable, AND

ACTION H

b. With RCIC or HPCI inoperable, place the inoperable CHANNEL(s) in the tripped condition within 96 hours or declare the ADS trip system(s) inoperable, AND

c. Place the inoperable CHANNEL(s) in the tripped condition within 8 days or declare the ADS trip system(s) inoperable.

ITS 3.3.5.1

A.1

3.3.5.1-1

TABLE 3.2.B-1 (Continued)

ECCS ACTUATION INSTRUMENTATION

A.8

Insert CTS Table 3.2.B-1 Note (a)

TABLE NOTATION

(a) A CHANNEL may be placed in an inoperable status for up to 2 hours for required surveillance without placing the CHANNEL in the tripped condition provided the associated Functional Unit maintains ECCS initiation capability.

Note (b) to Table 3.3.5.1-1 — (b) Also actuates the associated emergency diesel generator.

Note (a) to Table 3.3.5.1-1 — (c) When the system is required to be OPERABLE per Specification 3.5.B.

Note (c) to Table 3.3.5.1-1 — (d) Not required to be OPERABLE when reactor steam dome pressure is ≤150 psig.

(e) Required when the associated diesel generator is required to be OPERABLE per Specification 3.9.B. — A.9 moved to ITS 3.3.8.1

(f) This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required. — A.6

(g) With no LOCA signal present, there is an additional time delay of 5±0.25 minutes. — A.9 moved to ITS 3.3.8.1

(h) Reactor water level settings are expressed in inches above the top of active fuel (which is 360 inches above vessel zero). — LA.1

(i) Provides signal to pump suction valves only. — LA.2

(j) There is an inherent time delay of 7 ± 1.4 seconds on degraded voltage. — A.9 moved to ITS 3.3.8.1

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ITS 3.3.5.1

A.8

Insert CTS Table 3.2.B-1 Note (a)

Insert 14, Page 3/4.2-17

(a) When a CHANNEL is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required ACTIONs may be delayed as follows:

1) For up to six hours for Functional Units 3.e, 3.f, and 3.g; and
2) For up to six hours for Functional Units other than 3.e, 3.f, and 3.g provided the functional unit maintains actuation capability.

Note 2 to Surveillance Requirements

ITS 3.3.5.1

A.1

TAbLE ~~4.2.B-1~~ 3.3.5.1-1

ECCS ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

M.1 add Core Spray Pump Time Start - Time Delay Relay (Function 1.e)

Functional Unit	SR 3.3.5.1.1 CHANNEL CHECK	SR 3.3.5.1.2 SR 3.3.5.1.4 CHANNEL FUNCTIONAL TEST	SR 3.3.5.1.3 SR 3.3.5.1.5 SR 3.3.5.1.6 SR 3.3.5.1.7 CHANNEL CALIBRATION	Applicable OPERATIONAL MODE(s)
1 **1. CORE SPRAY (CS) SYSTEM**				
1.a a. Reactor Vessel Water Level - Low Low	S-1	M-2	A.8 ~~E~~ B/M-3	1, 2, 3, 4(a), 5(a) Table 3.3.5.1-Note (c)
1.b b. Drywell Pressure - High(a) A.6	NA	A.8 ~~M~~ Q-4	Q-6	1, 2, 3
1.c c. Reactor Vessel Pressure - Low (Permissive)	NA	~~M~~ Q-4	Q-6	1, 2, 3, 4(a), 5(a)
1.d d. CS Pump Discharge Flow - Low (Bypass)	NA	~~M~~ Q-4	7-E(a)-5 24 months LE.1	1, 2, 3, 4(a), 5(a)
2. LOW PRESSURE COOLANT INJECTION (LPCI) SUBSYSTEM				
2.a a. Reactor Vessel Water Level - Low Low	S-1	M-2	A.8 ~~E~~ B/M-3	1, 2, 3, 4(a), 5(a) Table 3.3.5.1 Note (a)
2.b b. Drywell Pressure - High(a) A.6	NA	A.8 ~~M~~ Q-4	Q-6	1, 2, 3
2.c c. Reactor Vessel Pressure - Low (Permissive)	NA	~~M~~ Q-4	Q-6	1, 2, 3, 4(a), 5(a)
2.f d. LPCI Pump Discharge Flow - Low (Bypass)	NA	~~M~~ Q-4	7-E(a)-5 24 months LE.1	1, 2, 3, 4(a), 5(a)
3. HIGH PRESSURE COOLANT INJECTION (HPCI) SYSTEM(a) Table 3.3.5.1 Note (c)				
3.a a. Reactor Vessel Water Level - Low Low	S-1	M-2	A.8 24 months ~~E~~ B/M-3	1, 2, 3
3.b b. Drywell Pressure - High(a) A.6	NA	A.8 ~~M~~ Q-4	Q-6	1, 2, 3
3.d c. Condensate Storage Tank Level - Low	NA	~~M~~ Q-4 M.5	~~NA~~ 24 months	1, 2, 3
3.e d. Suppression Chamber Water Level - High	NA	~~M~~ Q-4	NA	1, 2, 3
3.c e. Reactor Vessel Water Level - High (Trip)	NA	M-2	A.8 ~~E~~ B/M-3	1, 2, 3
3.f f. HPCI Pump Discharge Flow - Low (Bypass)	NA	A.8 ~~M~~ Q-4	7-E 24 months LE.1	1, 2, 3
3.g g. Manual Initiation	NA	SR3.3.5.1.8 E A.11 LD.1	NA	1, 2, 3

add Functions 2.d, 2.e, 2.g, 2.h, 2.i, 2.j and 2.k M.1

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3.3.5.1-1

TABLE ~~4.2.B-1~~ (Continued)

ECCS ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A.1

	Functional Unit	Table 3.3.5.1 Note (c)	SR 3.3.5.1.1 CHANNEL CHECK	SR 3.3.5.1.2 SR 3.3.5.1.4 CHANNEL FUNCTIONAL TEST	SR 3.3.5.1.3 SR 3.3.5.1.6 SR 3.3.5.1.7 CHANNEL CALIBRATION	Applicable OPERATIONAL MODE(s)
	4.	**AUTOMATIC DEPRESSURIZATION SYSTEM(a)**				
4.a/5.a	a.	Reactor Vessel Water Level - Low Low	S-1	M-2	A.8 ~~Q~~ B/M-3	1, 2, 3
4.b/5.b	b.	Drywell Pressure - High(c) A.6	NA	A.8 ~~M~~ Q-4	Q-6	1, 2, 3
4.c/5.c	c.	Initiation Timer	NA	LD.1 ~~E~~ A.12	7-E 24 months LE.1	1, 2, 3
4.f/5.f	d.	Low Low Level Timer	NA	~~E~~ A.12	7-E	1, 2, 3
4.d/5.d	e.	CS Pump Discharge Pressure - High (Permissive)	NA	~~M~~ Q-4	Q-6	1, 2, 3
4.e/5.e	f.	LPCI Pump Discharge Pressure - High (Permissive)	NA	~~M~~ Q-4	Q-6	1, 2, 3
	5.	**LOSS OF POWER**				
	a.	4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	NA	E	E	1, 2, 3, 4(d), 5(d)
	b.	4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	NA	E	E	1, 2, 3, 4(d), 5(d)

A.9 moved to ITS 3.3.8.1

ITS 3.3.5.1

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A.1

ITS 3.3.5.1

3.3.5.1-1

TABLE 4.2.B-1 (Continued)

ECCS ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATION

Table 3.3.5.1-1 Note(c)
(a) Not required to be OPERABLE when reactor steam dome pressure is ≤150 psig.

Table 3.3.5.1-1 Note(a)
(b) When the system is required to be OPERABLE per Specification 3.5.B.

A.9 moved to ITS 3.3.8.1

(c) Required when the associated diesel generator is required to be OPERABLE per Specification 3.9.B.

A.6

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

92 A.8

SR 3.3.5.1.5
SR 3.3.5.1.7
(e) Trip units are calibrated at least once per 31 days and transmitters are calibrated at the frequency identified in the table.

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ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 CTS 3.2.B requires the ECCS actuation instrumentation setpoints to be set consistent with the Trip Setpoint values shown in Table 3.2.B-1. CTS 3.2.B Action 1 requires the CHANNEL to be declared inoperable when the setpoint is less conservative than the value shown in the Trip Setpoint column of Table 3.2.B-1. Table 3.2.B-1 includes a "Trip Setpoint" column. It is proposed to re-label this column as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1 (ISTS Table 3.3.5.1-1). In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS Table 3.2.B-1 are applied as the Operability limit for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual trip setpoints specified in CTS Table 3.2.B-1 for the ECCS actuation instrumentation Functions or the Allowable Values specified in ITS Table 3.3.5.1-1 (see Discussion of Change LF.1 below for proposed changes to the Trip Setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

A.3 This proposed change to the CTS 3.2.B Actions provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3, "Completion Times," the ITS 3.3.5.1 ACTIONS Note ("Separate Condition entry is allowed for each....") provides direction consistent with the intent of the existing Actions for an inoperable ECCS instrumentation channel. It is intended that each inoperable channel is allowed a certain time to complete the Required Actions. Since this change only provides more explicit direction of the current interpretation of the existing specifications, this change is considered administrative.

ADMINISTRATIVE (continued)

A.4 Not used.

A.5 Not used.

A.6 CTS Table 3.2.B-1 Note (f) and CTS Table 4.2.B-1 Note (d) state that the Drywell Pressure—High Function (Functional Unit 1.b, 2.b, 3.b, 4.b, and 5.b) is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required in MODE 2 (i.e., when Special Test Exception 3.12.A is being used). These notes are deleted from CTS Table 3.2.A-1 and 4.2.A-1 since the only applicable condition in which these notes would be needed has been deleted (see Discussion of Changes for CTS: 3/4.12.A, in ITS Section 3.10). Therefore, Note (f) of CTS Table 3.2.B-1 and Note (d) of CTS Table 4.2.B-1 are no longer applicable and the change is considered administrative.

A.7 The detail in CTS Table 3.2.B-1 Functional Unit 3.g, HPCI Manual Initiation, that there is one channel "per system" has been deleted since there is only one HPCI System per unit. Since the Specifications apply equally to Units 1 and 2, this Note is not necessary. Since its removal is editorial, this change is administrative.

A.8 These changes to CTS 3/4.2.B are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 27, 1999. The changes identified are consistent with the allowances in NEDC-30936P-A, Part 1 and Part 2, "Technical Specification Improvement Methodology With Demonstration for BWR ECCS Actuation Instrumentation," December 1988. As such, these changes are considered to be administrative.

A.9 The technical content of the requirements of CTS Table 3.2.B-1 Functional Units 6.a and 6.b and Table 4.2.B-1 Functional Units 5.a and 5.b, including associated Notes and Actions, are being moved to ITS 3.3.8.1, "Loss of Power Instrumentation," in accordance with the format of the BWR ISTS, NUREG-1433, Rev. 1. Any technical changes to these requirements are addressed in the Discussion of Changes for ITS: 3.3.8.1, in this Section.

A.10 CTS Table 3.2.B-1 Action 35 requires placing the inoperable channel in trip when a HPCI Condensate Storage Tank Level—Low or a HPCI Suppression Chamber Water Level—High channel is inoperable. A new Required Action has been added, ITS 3.3.5.1 Required Action D.2.2, to allow the HPCI pump

ADMINISTRATIVE

A.10 (cont'd) suction to be aligned to the suppression pool in lieu of tripping the channel, if a Condensate Storage Tank Level—Low or Suppression Pool Water Level—High channel is inoperable. Since this proposed action results in the same condition as if the channel were tripped (tripping one channel results in the suction being aligned to the suppression chamber), this change is considered administrative.

A.11 CTS Table 4.2.B-1 requires a CHANNEL FUNCTIONAL TEST (CFT) of Functional Unit 3.g, the HPCI Manual Initiation Function, every 18 months. CTS 4.2.B.2 and proposed SR 3.3.5.1.8 require a LOGIC SYSTEM FUNCTIONAL TEST (LSFT) every 18 months (changed to 24 months - see Discussion of Change LD.1 below). Since the LSFT is a complete test of the logic, including the Manual Initiation switches, there is no need to require a CFT. Therefore, ITS 3.3.5.1 only requires an LSFT, and this change is considered administrative.

A.12 CTS Table 4.2.B-1 requires both a CHANNEL FUNCTIONAL TEST and a CHANNEL CALIBRATION of Functional Unit 4.c, ADS Initiation Timer, and Functional Unit 4.d, ADS Low Low Level Timer, (ITS Table 3.3.5.1-1 Functions 4.c, 5.c, 4.f, and 5.f) to be performed every 18 months. Since the CFT is included in the CTS and ITS definition of CHANNEL CALIBRATION and the CFT and the CHANNEL CALIBRATION are performed at the same Frequency, the CFT has been deleted for these Functions. The CHANNEL CALIBRATION will include the required testing of the CFT, therefore, this change is considered administrative.

A.13 CTS Table 3.2.B-1 Action 32 (for Functional Units 1.c and 2.c in MODES 4 and 5) requires the channels to be placed in the tripped condition within 24 hours. If this Action is not performed the CTS does not provide default actions, such as immediately declare the associated ECCS subsystem(s) inoperable. In this condition, ITS 3.3.5.1 ACTION H will require the associated supported subsystems to be declared inoperable immediately. CTS Table 3.2.B-1 Action 32 applies to the Reactor Vessel Pressure-Low (Permissive) Functions in MODES 4 and 5 whenever the supported systems are required to be OPERABLE as indicated in CTS Table 3.2.B-1 Note (c). Since CTS 3.0.C does not apply in MODES 4 and 5, the only alternative is to declare the associated supported subsystems inoperable. Therefore, this change is considered administrative.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 Eight additional Functions have been added to help ensure the automatic actuation function of the ECCS subsystems to ensure the design basis events can be satisfied. These Functions are included in ITS Table 3.3.5.1-1 as follows:

Function 1.e, Core Spray Pump Start - Time Delay Relay,
Function 2.d, Reactor Steam Dome Pressure - Low (Break Detection),
Function 2.e, LPCI Pump Start - Time Delay Relay for Pumps B and D,
Function 2.g, Recirculation Pump Differential Pressure-High (Break Detection),
Function 2.h, Recirculation Riser Differential Pressure-High (Break Detection),
Function 2.i, Recirculation Pump Differential Pressure Time Delay-Relay (Break Detection),
Function 2.j, Reactor Steam Dome Pressure Time Delay-Relay (Break Detection), and
Function 2.k, Recirculation Riser Differential Pressure Time Delay-Relay (Break Detection)

Appropriate ACTIONS and Surveillances (SR 3.3.5.1.4, 3.3.5.1.6, SR 3.3.5.1.7, and SR 3.3.5.1.8, as applicable) have also been added. This is an additional restriction on plant operation necessary to help ensure the ECCS Instrumentation are maintained Operable.

M.2 A maximum Allowable Value has been added for the CS Discharge Flow — Low (Bypass) Function (CTS Table 3.2.B-1 Functional Unit 1.d; ITS Table 3.3.5.1-1 Function 1.d) to ensure the valves will close to provide assumed ECCS flow to the core. The new Allowable Value is based upon the most recent setpoint calculations. This is an additional restriction on plant operation.

M.3 Not used.

M.4 Not used.

M.5 CTS Table 4.2.B-1 requires a CHANNEL FUNCTIONAL TEST (CFT) of Functional Unit 3.c, Condensate Storage Tank Level - Low every 92 days. The Table does not currently require a CHANNEL CALIBRATION. The channels associated with this Function include a level switch that must trip at the specified setpoint (Allowable Value, see Discussion of Change A.2). Therefore, the proposed test for OPERABILITY is a CHANNEL CALIBRATION (SR 3.3.5.1.7) at a Frequency of 24 months consistent with drift analysis assumptions in the plant setpoint methodology.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The detail in CTS Table 3.2.B-1 Note (h) related to the reference point of the Trip Setpoint of the reactor vessel water level instrumentation and the detail for CTS Table 3.2.B-1 for Functional Unit 3.d (Suppression Chamber Water Level) that the Trip Setpoint is referenced above the bottom of the chamber are proposed to be relocated to the UFSAR. This detail is not necessary to ensure the OPERABILITY of the ECCS instrumentation. The requirements of ITS 3.3.5.1 and the associated Surveillances are adequate to ensure the ECCS instrumentation is maintained OPERABLE. Therefore, this relocated detail is not required to be in the ITS to provide adequate protection of public health and safety. Changes to the UFSAR will be controlled by the provisions of 10 CFR 50.59.

LA.2 The system design detail specified in CTS Table 3.2.B-1, footnote (i), is proposed to be relocated to the Bases. Details relating to system design (e.g., valves associated with isolation signals) are unnecessary in the LCO. This detail is not necessary to ensure the OPERABILITY of the ECCS Instrumentation. The requirements of ITS 3.3.5.1 and the associated Surveillance Requirements are adequate to ensure the ECCS instruments are maintained OPERABLE. Therefore, the relocated detail is not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LD.1 The Frequency for performing the LOGIC SYSTEM FUNCTIONAL TEST (LSFT) of CTS 4.2.B.2 and the CHANNEL FUNCTIONAL TEST for the HPCI Manual Initiation and the ADS Initiation and Low Low Level Timer Functions specified in CTS Table 4.2.B-1 (changes made in Discussion of Changes A.11 and A.12 above) has been extended from 18 months to 24 months in proposed SR 3.3.5.1.8. This SR ensures that ECCS logic will function as designed to ensure proper response during an analyzed event. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2,

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd) 1991. Reviews of historical maintenance and surveillance data have shown that these tests normally pass their Surveillances at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. ECCS systems are tested on a more frequent basis during the operating cycle in accordance with CTS 4.2.B.1 (proposed SRs 3.3.5.1.1, 3.3.5.1.2, 3.3.5.1.3, 3.3.5.1.4, 3.3.5.1.5, and 3.3.5.1.6). These SRs will ensure that a significant portion of the ECCS circuitry is operating properly and will detect significant failures of this circuitry. The ECCS network including the actuating logic is designed to be single failure proof and therefore, is highly reliable. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LE.1 The Frequencies for performing CHANNEL CALIBRATIONS of CTS Table 4.2.B-1 for Functional Units 1.d, 2.d, 3.f, 4.c and 4.d have been extended from 18 months to 24 months in proposed SR 3.3.5.1.7. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2).

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991.

Extending the SR Frequency is acceptable because the ECCS network along with the ECCS initiation logic is designed to be single failure proof and therefore is highly reliable. Furthermore, the impacted ECCS instrumentation has been evaluated based on make, manufacturer and model number to determine that the instrumentation's actual drift falls within the design allowance in the associated setpoint calculation. The following paragraphs, listed by CTS Functional Unit number, identify by make, manufacturer and model number the drift evaluations performed:

Functional Unit 1.d, 2.d: CS/LPCI Discharge Flow - Low (Bypass)

This function is performed by Rosemount 1153DB3 Transmitters and 510DU/710DU Master Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 3.f: HPCI Pump Discharge Flow - Low (Bypass)

This function is performed by Barton 289 switches. The Barton switch drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) **Functional Unit 4.c:** ADS Initiation Timer

This function is performed by GE CR-120K02241AA time delay relays. The time delay relays' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 4.d: ADS Low Low Level Timer

This function is performed by Amerace ETR14D3002 and ETR14D3N003 time delay relays. The Amerace time delay relays' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Based on the design of the instrumentation and the drift evaluations, it is concluded that the impact, if any, on system availability is minimal as a result of the change in the surveillance test interval.

A review of the surveillance test history was performed to validate the above conclusion. This review of the surveillance test history demonstrates that there are no failures that would invalidate the conclusion that the impact, if any, on system availability is minimal from a change to a 24-month surveillance frequency. In addition, the proposed 24-month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd)

ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

None

RELOCATED SPECIFICATIONS

None

ITS 3.3.5.2

A.1

3.2 - LIMITING CONDITIONS FOR OPERATION

D. Reactor Core Isolation Cooling Actuation

LCO 3.3.5.2

The reactor core isolation cooling (RCIC) system actuation instrumentation CHANNEL(s) shown in Table 3.2.D-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column.

Allowable Value A.8

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3 with the reactor steam dome pressure >150 psig.

ACTION:

add proposed ACTIONS Note A.2

1. With a RCIC system actuation instrumentation CHANNEL trip setpoint less conservative than the value shown in the Trip Setpoint column of Table 3.2.D-1, declare the CHANNEL inoperable until the CHANNEL is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

   ACTION A

   Allowable Value A.8

2. With one or more RCIC system actuation instrumentation CHANNEL(s) inoperable, take the ACTION required by Table 3.2.D-1.

   ACTION A

4.2 - SURVEILLANCE REQUIREMENTS

D. Reactor Core Isolation Cooling Actuation

1. Each RCIC system actuation instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.2.D-1.

   Note 1 to Surveillance Requirements

2. LOGIC SYSTEM FUNCTIONAL TEST(s) of all CHANNEL(s) shall be performed at least once per 18 months.

   SR 3.3.5.2.6

   24 LD.1

3.3.5.2-1

TABLE 3.2.D-1

REACTOR CORE ISOLATION COOLING ACTUATION INSTRUMENTATION

A.8 Allowable Value

LA.1

LF.1

Note 2 to Surveillance Requirement

	Functional Unit	Trip Setpoint(c)	Minimum CHANNEL(s) per Trip Function(a)	ACTION
1	1. Reactor Vessel Water Level - Low Low	≥84 inches	4	B 40
2	2. Reactor Vessel Level - High (Trip)	≤201 inches	2	C 41
3	3. Condensate Storage Tank Level - Low	≥598' El.	2(b) LA.2	D 42
4	4. Suppression Chamber Water Level - High	≤14'8" above bottom of chamber LA.1	2(b)	D 42
5	5. Manual Initiation	NA	1/system A.9	C 43

D.1

A.4

Insert CTS Table 3.2.D-1 Note (a)

---

a A CHANNEL may be placed in an inoperable status for up to 2 hours for required surveillance without placing the CHANNEL in the tripped condition provided the Functional Unit maintains RCIC actuation capability.

b Provides signal to pump suction valves only. LA.2

c Reactor vessel water level settings are expressed in inches above the top of active fuel (which is 360 inches above vessel zero). LA.1

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ITS 3.3.5.2

ITS 3.3.5.2

A.4

Insert CTS Table 3.2.0-1 Note (a)

Insert 18, Page 3/4.2-26

a When a CHANNEL is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required ACTIONs may be delayed as follows:

Note 2 to Surveillance Requirement

1) For up to six hours for Functional Units 2 and 5; and
2) For up to six hours for Functional Units other than 2 and 5 provided the functional unit maintains actuation capability.

ITS 3.3.5.2

A.1

TABLE ~~3.2.D-1~~ (Continued)

3.3.5.2-1

REACTOR CORE ISOLATION COOLING ACTUATION INSTRUMENTATION

ACTION

INSERT ACTION 40

~~ACTION 40 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement:~~

~~a. With one CHANNEL inoperable, place the inoperable CHANNEL in the tripped condition within one hour or declare the RCIC system inoperable.~~

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

A.6 Function

within 24 hours restore the inoperable channel A.4

ACTION 41 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement, declare the RCIC system inoperable.

ACTION C)

ACTION E)

~~ACTION 42 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement, place at least one inoperable CHANNEL in the tripped condition within one hour or declare the RCIC system inoperable.~~

ACTION 43 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum OPERABLE CHANNEL(s) per TRIP SYSTEM requirement, restore the inoperable CHANNEL to OPERABLE status within ~~8 hours~~ 24 hours or declare the RCIC system inoperable.

ACTION C

ACTION E)

A.4

A.6 Function

Insert ACTION 42 A.4

Page 4 of 7

A.4

ITS 3.3.5.2

Insert 19, Page 3/4.2-27

Insert ACTION 40

ACTION 40- With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement:

ACTION B

a. Within one hour from discovery of loss of initiation capability declare RCIC inoperable, AND

b. Place the inoperable CHANNEL(s) in the tripped condition within 24 hours or declare RCIC inoperable

ACTION E

Page 5 of 7

A.4

ITS 3.3.5.2

Insert ACTION 42

Insert 20, Page 3/4.2-27

ACTION 42 – With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement:

ACTION D

a. Within one hour from discovery of loss of initiation capability declare RCIC inoperable, AND

b. Place the inoperable CHANNEL(s) in the tripped condition within 24 hours or declare RCIC inoperable

ACTION E)

add proposed Required Action D.2.2

A.5

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3.3.5.2-1

TABLE 4.2.D-1

REACTOR CORE ISOLATION COOLING ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

D.1

Functional Unit	SR 3.3.5.2.1 CHANNEL CHECK	SR 3.3.5.2.2 SR 3.3.5.2.4 CHANNEL FUNCTIONAL TEST	SR 3.3.5.2.3 SR 3.3.5.2.5 CHANNEL CALIBRATION
1. Reactor Vessel Water Level - Low Low	S -1	M - 2	A.4 E — B/M — 3
2. Reactor Vessel Water Level - High (Trip)	S - 1	M - 2	A.4 E — B/M — 3
3. Condensate Storage Tank Level - Low	~~NA~~	A.4 M — Q - 4	~~NA~~ 24 months M.2
4. Suppression Chamber Water Level - High	~~NA~~	A.4 M — Q - 4	NA
5. Manual Initiation	~~NA~~	A.7 E — 6 24months LD.1	~~NA~~

ITS 3.3.5.2

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ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 This proposed change to the CTS 3.2.D Actions provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3, "Completion Times," the ITS 3.3.5.2 ACTIONS Note ("Separate Condition entry is allowed for each....") provides direction consistent with the intent of the existing Actions for an inoperable RCIC instrumentation channel. It is intended that each inoperable channel is allowed a certain time to complete the Required Actions. Since this change only provides more explicit direction of the current interpretation of the existing specifications, this change is considered administrative.

A.3 Not used.

A.4 These changes to CTS 3/4.2.D are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 27, 1999. The changes identified are consistent with the allowances in GENE-770-06-2-A, "Bases for Changes to Surveillance Test intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specification," December 1992. As such, the changes are administrative.

A.5 CTS Table 3.2.D-1 Action 42 requires placing the inoperable channel in trip when a Condensate Storage Tank Level—Low or Suppression Chamber Water Level—High channel is inoperable. A new Required Action has been added (ITS 3.3.5.2 Required Action D.2.2) to allow the RCIC pump suction to be aligned to the suppression pool in lieu of tripping the channel, if a Condensate Storage Tank Level—Low or Suppression Chamber Water Level—High channel is inoperable. Since this proposed action results in the same condition as if a channel were tripped (tripping one channel results in the suction being aligned to the suppression pool), this change is considered administrative.

ADMINISTRATIVE (continued)

A.6 The column title in CTS Table 3.2.D-1 is on a per Function basis rather than the per Trip System basis indicated in CTS Table 3.2.D-1 and Actions 41 and 43. All required channels are specified in the column. Therefore, reference to Trip System has been deleted and replaced with Function as indicated in ITS Table 3.3.5.2-1 and the ITS 3.3.5.2 ACTIONS.

A.7 CTS Table 4.2.D-1 requires a CHANNEL FUNCTIONAL TEST (CFT) of Functional Unit 5, the Manual Initiation Function, every 18 months. CTS 4.2.D.2 and proposed SR 3.3.5.2.6 require a LOGIC SYSTEM FUNCTIONAL TEST (LSFT) every 18 months (changed to 24 months - see Discussion of Change LD.1 below). Since the LSFT is a complete test of the logic, including the Manual Initiation switches, there is no need to require a CFT. Therefore, ITS 3.3.5.2 only requires an LSFT, and this change is considered administrative.

A.8 CTS 3.2.D requires the RCIC System actuation instrumentation setpoints to be set consistent with the Trip Setpoint values shown in Table 3.2.D-1. CTS 3.2.D Action 1 requires the CHANNEL to be declared inoperable when the setpoint is less conservative than the value shown in the Trip Setpoint column of Table 3.2.D-1. Table 3.2.D-1 includes a "Trip Setpoint" column. It is proposed to re-label this column as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1 (ISTS Table 3.3.5.2-1). In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS Table 3.2.D-1 are applied as the Operability limit for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual trip setpoints specified in CTS Table 3.2.D-1 for the RCIC System actuation instrumentation Functions or the Allowable Values specified in ITS Table 3.3.5.2-1 (see Discussion of Change LF.1 below for proposed changes to the Trip Setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

A.9 The detail in CTS Table 3.2.D-1 Functional Unit 5, RCIC Manual Initiation, that there is one channel “per system” has been deleted since there is only one RCIC System per unit. Since the Specifications apply equally to Units 1 and 2, this Note is not necessary. Since its removal is editorial, this change is administrative.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 Not used.

M.2 CTS Table 4.2.D-1 requires a 92 day CHANNEL FUNCTIONAL TEST of Functional Unit 3, Condensate Storage Tank Level—Low. The Table does not currently require a CHANNEL CALIBRATION. The channels associated with this Function include a level switch which must trip at the specified setpoint Allowable Value (see Discussion of Changes A.8 and LF.1). Therefore, a CHANNEL CALIBRATION requirement is added at a Frequency of 24 months consistent with drift analysis assumptions in the plant setpoint methodology. This change represents an additional restriction on plant operation necessary to ensure these RCIC System instruments are maintained OPERABLE.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The detail in CTS Table 3.2.D-1 Note (c) related to the reference setting of the reactor vessel water level instrumentation (CTS Table 3.2.D-1 Functional Units 1 and 2) and the detail for CTS Table 3.2.D-1 for Functional Unit 4 (Suppression Chamber Water Level) that the Trip Setpoint is referenced above the bottom of the chamber are proposed to be relocated to the UFSAR. These details are not necessary to ensure the OPERABILITY of the RCIC System instrumentation. The requirements of ITS 3.3.5.2 and the associated Surveillances are adequate to ensure the RCIC System instrumentation is maintained OPERABLE. Therefore, these relocated details are not required to be in the ITS to provide adequate protection of public health and safety. Changes to the UFSAR will be controlled by the provisions of 10 CFR 50.59.

LA.2 System design and operation details specified in CTS Table 3.2.D-1, Note (b) (which indicates that the Condensate Storage Tank Level—Low and Suppression Chamber Water Level—High channels provide signals to pump suction valves) are proposed to be relocated to the Bases. Details relating to system design and operation are unnecessary in the LCO. These details are not necessary to ensure the OPERABILITY of the RCIC System Instrumentation. The requirements of ITS 3.3.5.2 and the associated Surveillance Requirements are adequate to ensure the RCIC System instruments are maintained OPERABLE. Therefore, the relocated detail is not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

LD.1 The Frequency for performing the LOGIC SYSTEM FUNCTIONAL TEST (LSFT) of CTS 4.2.D.2 and the CHANNEL FUNCTIONAL TEST for the RCIC Manual Initiation Function specified in CTS Table 4.2.D-1 Functional Unit 5 (changed to LSFT in Discussion Change A.7 above) has been extended from 18 months to 24 months in proposed SR 3.3.5.2.6. This SR ensures that RCIC logic will function as designed to ensure proper response during an analyzed event. The proposed change will allow this Surveillance to extend the Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that this test normally passes the Surveillance at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. The system function testing performed in ITS 3.5.3 overlaps this surveillance to provide complete testing of the safety function. The RCIC system is tested on a more frequent basis during the operating cycle in accordance with proposed SRs 3.3.5.2.1, 3.3.5.2.2, 3.3.5.2.3, 3.3.5.2.4, and 3.3.5.2.5. This testing of the RCIC system ensures that a significant portion of the RCIC circuitry is operating properly and will detect significant failures of this circuitry. RCIC system actuating logic is designed to be single failure proof and therefore, is highly reliable. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd) Based on the above discussion, the impact, if any, of this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequency, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) does not invalidate any assumptions in the plant licensing basis.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

None

RELOCATED SPECIFICATIONS

None

A.1

ITS 3.3.6.1

3.2 - LIMITING CONDITIONS FOR OPERATION

A. Isolation Actuation

LCO 3.3.6.1 The isolation actuation instrumentation CHANNEL(s) shown in Table 3.2.A-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the ~~Trip Setpoint~~ Allowable Values A.7 column.

APPLICABILITY:

As shown in Table 3.2.A-1.

ACTION: add proposed ACTIONS Note A.2

ACTIONS A and B

1. With an isolation actuation instrumentation CHANNEL trip setpoint less conservative than the value shown in the ~~Trip Setpoint~~ Allowable Value A.7 column of Table 3.2.A-1, declare the CHANNEL inoperable until the CHANNEL is restored to OPERABLE status with its trip setpoint adjusted consistent with the ~~Trip Setpoint~~ value.
2. ~~With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement for one TRIP SYSTEM, place the inoperable CHANNEL(s) and/or TRIP SYSTEM in the tripped condition[a] within one hour.~~

A.3 Insert CTS 3.2.A Actions 2

4.2 - SURVEILLANCE REQUIREMENTS

A. Isolation Actuation

Note 1 to Surveillance Requirements

1. Each isolation actuation instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL MODE(s) and at the frequencies shown in Table 4.2.A-1.

SR 3.3.6.1.6

2. LOGIC SYSTEM FUNCTIONAL TEST(s) of all CHANNEL(s) shall be performed at least once per ~~18~~ 24 LD.1 months.

A.3 Insert CTS 3.2.A footnote a

~~[a] An inoperable CHANNEL need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, the inoperable CHANNEL shall be restored to OPERABLE status within 2 hours or the ACTION required by Table 3.2.A-1 for that trip function shall be taken.~~

Page 1 of 12

3.2 - LIMITING CONDITIONS FOR OPERATION

4.2 - SURVEILLANCE REQUIREMENTS

~~3. With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement for both TRIP SYSTEMS, place at least one TRIP SYSTEM~~[b] ~~in the tripped condition~~[c] ~~within one hour and take the ACTION required by Table 3.2.A-1.~~

Insert CTS 3.2.A Action 2

A.3

A.3

~~[b] If more CHANNEL(s) are inoperable in one TRIP SYSTEM than in the other, select the TRIP SYSTEM with the greater number of inoperable CHANNEL(s) to place in the tripped condition except when this would cause the trip function to occur; if both TRIP SYSTEM(s) have the same number of inoperable CHANNEL(s), place either TRIP SYSTEM in the tripped condition.~~

A.3

~~[c] An inoperable CHANNEL need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, the inoperable CHANNEL shall be restored to OPERABLE status within one hour or the ACTION required by Table 3.2.A-1 for that trip function shall be taken.~~

A.3

ITS 3.3.6.1

Insert CTS 3.2.A Action 2

Insert 5, Pages 3/4.2-1, 3/4.2-2

2. With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement:

ACTION B

a) Within 1 hour, verify sufficient CHANNELS remain OPERABLE or in the tripped condition to ensure automatic isolation capability.

ACTION A

b) Within 12 hours, place the inoperable CHANNEL(s) and/or TRIP SYSTEM in the tripped condition(a) for Table 3.2.A-1 Functional Units common to RPS: 1a, 1b, 2a, 2b, 3a, 3b, 4b, and 7a, and

A.5 moved to ITS 3.3.6.2 ITS 3.3.7.1

A.6

c) Within 24 hours, place the inoperable CHANNEL(s) and/or TRIP SYSTEM in the tripped condition(a) for Table 3.2.A-1 Functional Units not common to RPS.

OR

ACTION C Take the ACTION required by Table 3.2.A-1.

A.3

Insert CTS 3.2.A footnote (a)

LA.1

a An inoperable channel need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to OPERABLE status within the required time, the ACTION required by Table 3.2.A-1 for the Functional Unit shall be taken.

ACTION C

TABLE ~~3.2.A-1~~ 3.3.6.1.1

ISOLATION ACTUATION INSTRUMENTATION

A.7 Allowable Value

LA.2

Note 2 to Surveillance Requirements

	Function ~~Functional Unit~~	~~Trip Setpoint~~(j)	Minimum CHANNEL(s) per TRIP SYSTEM(a)	Applicable OPERATIONAL MODE(s)	ACTION
2.	1. PRIMARY CONTAINMENT ISOLATION	LF.1			
2.a	a. Reactor Vessel Water Level - Low	≥144 inches	2	1, 2, 3	G 20
2.b	b. Drywell Pressure - High~~(d)~~ A.4	≤2.5 psig	2	1, 2, 3	G 20
2.c	c. Drywell Radiation - High	≤100 R/hr	1	1, 2, 3	F 23
	2. SECONDARY CONTAINMENT ISOLATION				A.5 moved to ITS 3.3.6.2 3.3.7.1
	a. Reactor Vessel Water Level - Low(c,k)	≥144 inches	2	1, 2, 3 & *	24
	b. Drywell Pressure - High(c,d,k)	≤2.5 psig	2	1, 2, 3	24
	c. Reactor Building Ventilation Exhaust Radiation - High(c,k)	≤10 mR/hr	2	1, 2, 3 & **	24
	d. Refueling Floor Radiation - High(c,k)	≤100 mR/hr	2	1, 2, 3 & **	24
1.	3. MAIN STEAM LINE (MSL) ISOLATION	LF.1			
1.a	a. Reactor Vessel Water Level - Low Low	≥84 inches	2	1, 2, 3	D 21
	~~b. MSL Tunnel Radiation - High(b)~~	~~≤15(h) x normal background~~	~~2~~	~~1, 2, 3~~	21 A.6
1.b	c. MSL Pressure - Low	≥825 psig	2	1	E 22
1.d	d. MSL Flow - High~~(k)~~ A.5 moved to ITS 3.3.7.1	≤140% of rated	2/line	1, 2, 3	D 21
1.e	e. MSL Tunnel Temperature - High	≤200°F	~~2 of 4 in each of 2 sets~~ 2 per string A.11	1, 2, 3	D 21

LF.1

add proposed Function 1.c M.1

A.1

ITS 3.3.6.1

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A.1

TABLE 3.2.A-1 (Continued)

3.3.6.1-1

ISOLATION ACTUATION INSTRUMENTATION

Allowable Value A.1

LA.2

Note 2 to Surveillance Requirements

	Function Functional Unit		Trip Setpoint(a)	Minimum CHANNEL(s) per TRIP SYSTEM(a)	Applicable OPERATIONAL MODE(s)	ACTION
5.	4.	**REACTOR WATER CLEANUP SYSTEM ISOLATION**				
5.a	a.	Standby Liquid Control System Initiation(g) LA.3	LF.1 NA	~~NA~~ ① M.3	1, 2, ③ L.2	H 23
5.b	b.	Reactor Vessel Water Level - Low	≥144 inches	2 M.4	1, 2, 3	F 23
4.	5.	**REACTOR CORE ISOLATION COOLING ISOLATION**	add proposed Function 4.b			
4.a	a.	Steam Flow - High	LF.1 ≤300% of rated steam flow(i)	1	1, 2, 3	F 23
4.c	b.	Reactor Vessel Pressure - Low	≥60 psig	4(d) Note (a) to Table 3.3.6.1-1	1, 2, 3	F 23
4.d	c.	Area Temperature - High	≤170°F	2	1, 2, 3	F 23
3.	6.	**HIGH PRESSURE COOLANT INJECTION ISOLATION**	add proposed Function 3.b	M.4		
3.a	a.	Steam Flow - High	LF.1 ≤300% of rated steam flow(i)	1	1, 2, 3	F 23
3.c	b.	Reactor Vessel Pressure - Low	≥100 psig	2	1, 2, 3	F 23
3.e	c.	Area Temperature - High	≤170°F	2	1, 2, 3	F 23

add Function 3.d M.2

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ITS 3.3.6.1

TABLE ~~3.2.A-1~~ 3.3.6.1-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION

Allowable Value A.7

LA2

Note 2 to Surveillance Requirement

	Functional Unit	Trip Setpointⓗ	Minimum CHANNEL(s) per TRIP SYSTEMⓐ	Applicable OPERATIONAL MODE(s)	ACTION
6	**7. RHR SHUTDOWN COOLING MODE ISOLATION**				
6.b	a. Reactor Vessel Water Level - Low	≥144 inches	2ⓖ Note (b) to Table 3.3.6.1-1	3, 4, 5	I 23 L.3
6.a	b. Reactor Vessel Pressure - High (Cut-in Permissive)	≤135 psig LF.1	2	1, 2, 3	F 23

A.1

ITS 3.3.6.1

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3.3.6.1-1 A.1

TABLE ~~3.2.A-1~~ (Continued)

ISOLATION ACTUATION INSTRUMENTATION

ACTION

G **ACTION 20 -** Be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

L.4 (12)

D **ACTION 21 -** ~~Be in at least STARTUP~~ with the associated isolation valves closed within ~~8~~ hours or be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

E **ACTION 22 -** Be in at least STARTUP within 8 hours.

L.2 for SLC Initiation Function

H|F **ACTION 23 -** Close the affected system isolation valves within one hour ~~and declare the affected system inoperable.~~

A.8

~~**ACTION 24 -** Establish SECONDARY CONTAINMENT INTEGRITY with the standby gas treatment system operating within one hour.~~

add proposed ACTION G L.1

A.5 moved to ITS 3.3.6.2

Page 7 of 12

3.3.6.1-1 A.1

TABLE 3.2.A-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION

A.5 moved to ITS 3.3.6.2 ITS 3.3.7.1

TABLE NOTATION

* During CORE ALTERATIONS or operations with a potential for draining the reactor vessel. A.3

** When handling irradiated fuel in the secondary containment.

Insert CTS Table 3.2.A-1 Note (a)

(a) ~~A CHANNEL may be placed in an inoperable status for up to 2 hours for required surveillance without placing the CHANNEL in the tripped condition provided the Functional Unit maintains isolation actuation capability.~~ A.6

(b) Also trips the mechancal vacuum pump and isolates the steam jet air ejectors.

(c) Isolates the reactor building ventilation system and actuates the standby gas treatment system. A.5 moved to ITS 3.3.6.2 3.3.7.1

(d) ~~This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required.~~ A.4

Note (a) to Table 3.3.6.1-1 (e) Only one TRIP SYSTEM.

(f) ~~Closes only reactor water cleanup system isolation valves.~~ LA.3 A.9

Note b to Table 3.3.6.1-1 (g) Only one trip system required in OPERATIONAL MODE(s) 4 and 5 with RHR Shutdown Cooling System integrity maintained. ~~System integrity is maintained provided the piping is intact and no maintenance is being performed that has the potential for draining the reactor vessel through the system.~~ LA.4

(h) ~~Normal background is as measured during full power operation without hydrogen being injected.~~ A.6

Allowable Value Functions 3.b, 4.b (i) Includes a time delay of 3 ≤ t ≤ 9 seconds. LF.1

(j) ~~Reactor vessel water level settings are expressed in inches above the top of active fuel (which is 360 inches above vessel zero).~~ LA.2

(k) Also isolates the control room ventilation system. A.5 moved to ITS 3.3.7.1

A.3

ITS 3.3.6.1

Insert CTS Table 3.2.A-1 Note a

Insert 6, Page 3/4.2-7

(a) When a CHANNEL is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required ACTIONs may be delayed for up to 6 hours provided the Functional Unit maintains isolation actuation capability.

Note 2 to Surveillance Requirements

ITS 3.3.6.1

TABLE 4.2.A-1 3.3.6.1-1

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Functional Unit	SR 3.3.6.1.1 CHANNEL CHECK	SR 3.3.6.1.2 CHANNEL FUNCTIONAL TEST	SR 3.3.6.1.3 SR 3.3.6.1.4 SR 3.3.6.1.5 CHANNEL CALIBRATION	Applicable OPERATIONAL MODE(s)
2. 1. **PRIMARY CONTAINMENT ISOLATION**		A.3	24 months LE.1	
2.a a. Reactor Vessel Water Level - Low	S - 1	~~M~~ Q - 2	5 E(a) - 3	1, 2, 3
2.b b. Drywell Pressure - High(M) A.4	NA	~~M~~ Q - 2	Q - 4	1, 2, 3
2.c c. Drywell Radiation - High	S - 1	~~M~~ Q - 2	E - 5	1, 2, 3 A.5 moved to ITS 3.3.6.2 3.3.7.1
2. **SECONDARY CONTAINMENT ISOLATION**		A.3		A.1
a. Reactor Vessel Water Level - Low(c,d)	S	~~M~~ Q	E(a)	1, 2, 3 & *
b. Drywell Pressure - High(b,c,d)	NA	~~M~~ Q	Q	1, 2, 3
c. Reactor Building Ventilation Exhaust Radiation - High(c,d)	S	~~M~~ Q	Q	1, 2, 3 & **
d. Refueling Floor Radiation - High(c,d)	S	~~M~~ Q	Q	1, 2, 3 & **
1 3. **MAIN STEAM LINE (MSL) ISOLATION**		A.3		A.6
1.a a. Reactor Vessel Water Level - Low Low	S - 1	~~M~~ Q - 2	5 E(a) - 3	1, 2, 3
~~b. MSL Tunnel Radiation - High~~	~~S~~	~~M~~ Q	~~E(a)~~	~~1, 2, 3~~
1.b c. MSL Pressure - Low	NA	~~M~~ Q - 2	Q - 4	1
1.d d. MSL Flow - High(a) A.5	S - 1	~~M~~ Q - 2	E Q M.5	1, 2, 3
1.e e. MSL Tunnel Temperature - High	NA	E A.10 24 months LD.1	E - 5 24 months LE.1	1, 2, 3

add proposed Function 1.c Surveillances M.1

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TABLE 4.2.A-1 (Continued) 3.3.6.1-1

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Functional Unit	SR 3.3.6.1.1 CHANNEL CHECK	SR 3.3.6.1.2 CHANNEL FUNCTIONAL TEST	SR 3.3.6.1.3 SR 3.3.6.1.4 SR 3.3.6.1.5 CHANNEL CALIBRATION	Applicable OPERATIONAL MODE(s)
5 4. REACTOR WATER CLEANUP SYSTEM ISOLATION				
5.a a. Standby Liquid Control System Initiation	NA	SR 3.3.6.1.6 E A.10 24 months LD.1	NA	1, 2, 3 L.2
5.b b. Reactor Vessel Water Level - Low	S - 1	A.3 M Q - 2	5 - E(a) - 3 24 months LE.1	1, 2, 3
4. 5. REACTOR CORE ISOLATION COOLING ISOLATION				
4.a a. Steam Flow - High add proposed Functions 4.b M.4	NA	A.3 M Q - 2	Q - 4	1, 2, 3
4.c b. Reactor Vessel Pressure - Low	NA	M Q - 2	Q - 4	1, 2, 3
4.d c. Area Temperature - High	NA	E A.10 24 months LD.1	E - 5	1, 2, 3
3. 6. HIGH PRESSURE COOLANT INJECTION ISOLATION				
3.a a. Steam Flow - High add proposed Function 3.b M.4	NA	A.3 M Q - 2	5 E(a) - 3	1, 2, 3
3.c b. Reactor Vessel Pressure - Low	NA	M Q - 2	5 - E(a) - 3	1, 2, 3
3.e c. Area Temperature - High add proposed Function 3.d M.2	NA	SR3.3.6.1.6 E A.10	E - 5 24 months LE.1	1, 2, 3
6. 7. RHR SHUTDOWN COOLING MODE ISOLATION				
6.b a. Reactor Vessel Water Level - Low	S - 1	A.3 M Q - 2	5 - E(a) - 3	3, 4, 5
6.a b. Reactor Vessel Pressure - High (Cut-in Permissive)	NA	M Q - 2	Q - 4	1, 2, 3

A.1

ITS 3.3.6.1

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ITS 3.3.6.1

A.1

TABLE 4.2.A-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A.5 moved to ITS 3.3.6.2 ITS 3.3.7.1

TABLE NOTATION

* During CORE ALTERATIONS or operations with a potential for draining the reactor vessel.

** When handling irradiated fuel in the secondary containment.

SR 3.3.6.1.3

SR 3.3.6.1.5

92 A.3

(a) Trip units are calibrated at least once per 31 days and transmitters are calibrated at the frequency identified in the table.

A.4

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

(c) Isolates the reactor building ventilation system and actuates the standby gas treatment system.

(d) Also isolates the control room ventilation system.

A.5 moved to ITS 3.3.6.2 ITS 3.3.7.1

(e) These instrument channels will be calibrated using simulated electrical signals once every three months. In addition, calibration including the sensors will be performed every 18 months.

A.6

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ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 This proposed change to the CTS 3.2.A Actions provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3, "Completion Times," the ITS 3.3.6.1 ACTIONS Note ("Separate Condition entry is allowed for each....") and the wording for ACTION A ("One or more channels...") and ACTION B ("One or more automatic Functions...") provides direction consistent with the intent of the existing Actions for an inoperable isolation instrumentation channel. It is intended that each inoperable channel is allowed a certain time to complete the Required Actions. Since this change only provides more explicit direction of the current interpretation of the existing specifications, this change is considered administrative.

A.3 These changes to CTS 3/4.2.A are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 27, 1999. The changes identified are consistent with the allowances in NEDC-31677-P-A, "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation," July 1980, and NEDC-30851P-A Supplement 2, "Technical Specifications Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," March 1989. As such, these changes are administrative.

A.4 CTS Table 3.2.A-1 Note (d) and CTS Table 4.2.A-1 Note (b) state that the Drywell Pressure—High Function (Functional Unit 1.b) is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required in MODE 2 (i.e., when Special Test Exception 3.12.A is being used). These notes are deleted from CTS Table 3.2.A-1 and 4.2.A-1 since the only applicable condition in which these notes would be needed has been deleted (see Discussion of Changes for CTS: 3/4.12.A, in ITS Section 3.10). Therefore, Note (d) of CTS Table 3.2.A-1 and Note (b) of CTS Table 4.2.A-1 are no longer required and the change is considered administrative.

ADMINISTRATIVE (continued)

A.5 The requirements identified in CTS Tables 3.2.A-1 and 4.2.A-1 related to Secondary Containment Isolation (including Notes (c), (d), (k), (*) and (**) to Table 3.2.A-1 and Notes (b), (c), (d), (*), and (**) to Table 4.2.A-1) have been moved to ITS 3.3.6.2, Secondary Containment Isolation Instrumentation, and ITS 3.3.7.1, Control Room Emergency Ventilation System Instrumentation. Any technical changes to these requirements are addressed in the Discussion of Changes for ITS 3.3.6.2 and ITS 3.3.7.1.

A.6 These changes to CTS 3/4.2.A are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 30, 1999. These changes identified are consistent with allowances in NEDO-31400A to remove the main steam isolation as a result of a main steam line high radiation signal. As such, this change is considered administrative.

A.7 CTS 3.2.A requires the isolation actuation instrumentation setpoints to be set consistent with the Trip Setpoint values shown in Table 3.2.A-1. CTS 3.2.A Action 1 requires the CHANNEL to be declared inoperable when the setpoint is less conservative than the value shown in the Trip Setpoint column of Table 3.2.A-1. Table 3.2.A-1 includes a "Trip Setpoint" column. It is proposed to re-label this column as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1 (ISTS Table 3.3.6.1-1). In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS Table 3.2.A-1 are applied as the Operability limit for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual trip setpoints specified in CTS Table 3.2.A-1 for the isolation actuation instrumentation Functions or the Allowable Values specified in ITS Table 3.3.6.1-1 (see Discussion of Change LF.1 below for proposed changes to the Trip Setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

A.8 An action to "declare the affected system inoperable," as presented in CTS Table 3.2.A-1 Action 23, is an unnecessary reminder that other Technical Specifications may be affected. This is essentially a "cross reference" between Technical Specifications that has been determined to be adequately provided through training. In addition, the definition of "OPERABILITY in ITS Section 1.1 would also ensure that the affected systems rendered inoperable by isolation of an affected line are declared inoperable. Therefore, this deletion is administrative.

ADMINISTRATIVE (continued)

A.9 The requirement in CTS Table 3.2.A-1 footnote (g) that only one trip system is required in MODES 4 and 5 with RHR Shutdown Cooling System integrity maintained has been revised for clarification. This footnote is associated with the RHR Shutdown Cooling Mode Isolation Reactor Vessel Water Level—Low Function channels. The logic associated with this sytem is described in the Bases as a one-out-of-two taken twice logic to initiate isolation. Therefore, for trip initiation, one of two channels in each of two trip systems must trip for isolation. The requirements of this footnote have been incorporated in proposed footnote (b) to Table 3.3.6.1-1. The proposed footnote states that in MODES 4 and 5, provided RHR Shutdown Cooling System integrity is maintained, only one channel per trip system with an isolation signal available to one shutdown cooling pump suction isolation valve is required. This proposed requirement is consistent with current Technical Specification interpretation of the current requirement and therefore this change is considered administrative. In both cases (in the ITS and CTS), the system will maintain isolation capability at all times.

A.10 The CHANNEL FUNCTIONAL TEST (CFT) requirements for CTS Table 4.2.A-1 Functional Unit 3.e, MSL Tunnel Temperature—High, Functional Unit 4.a, Standby Liquid Control System Initiation, Functional Unit 5.c, RCIC Area Temperature—High, and Functional Unit 6.c, HPCI Area Temperature—High, have been deleted. The CFT is redundant to the LOGIC SYSTEM FUNCTIONAL TEST (LSFT) for Functional Unit 4.a. The SLC System Initiation channels have no adjustable setpoints, but are based on switch manipulation. The LSFT (proposed SR 3.3.6.1.6), which applies to ITS Table 3.3.6.1-1 Function 5.a (SLC System Initiation), tests all contacts and will provide proper testing of the channels tested by a CFT. In addition, by definition, the CHANNEL CALIBRATION includes a CHANNEL FUNCTIONAL TEST. The CHANNEL FUNCTIONAL TESTs for Functional Units 3.e, 5.c, and 6.c are performed at the same frequency as the CHANNEL CALIBRATIONS for Functional Units 3.e, 5.c, and 6.c. Therefore, these deletions are considered administrative.

A.11 CTS 3.2.A and CTS Table 3.2.A-1 require Functional Unit 3.e, Main Steam Line (MSL) Tunnel Temperature—High, to have at least 2 channels (of the 4) in each of 2 sets OPERABLE per trip system. It is proposed to clarify this requirement by replacing the words "2 of 4 in each of 2 sets" with "2 per trip string" such that the requirement is consistent with the terminology used in BWR ISTS, NUREG-1433, Rev. 1, for describing other similar trip logic schemes. The MSL Tunnel Temperature—High Functional Unit includes a total of 16 temperature switches, four for each steam tunnel area. One channel from each steam tunnel area inputs to one of four trip strings. Two trip strings make up a

ADMINISTRATIVE

A.11 (cont'd) trip system and both trip systems must trip to cause an isolation. According to the CTS terminlogy, a "set" refers to the four area temperature switches that are arranged in a series contact scheme. Each "set" of four temperature switch contacts open on high temperature to actuate (de-energize) a logic relay. The BWR ISTS would refer to this trip logic scheme as a "trip string." Thus, the CTS terminology for a "set" is equivalent to the BWR ISTS terminology for a "trip string." Furthermore, since there are two trip strings per trip system, the minimum channel requirement of "2 of 4 in each of 2 sets" is equivalent to the proposed requirement of "2 per trip string." This change is considered a presentation preference change since it serves only to clarify an existing requirement by using the BWR ISTS terminology. As such, this change is administrative.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 An additional Function has been added, ITS Table 3.3.6.1-1 Function 1.c. This Function is the Main Steam Line Low Pressure—Timer (or Time Delay). This Function is required to ensure the OPERABILITY of the current and proposed MSL Pressure—High Function (CTS Table 3.2.A-1 Function 3.c and ITS Table 3.3.6.1-1 Function 1.b). This Function provides a time delay for the MSL Pressure—High Function to ensure an inadvertent main steam line isolation does not occur during transients which result in reactor steam dome pressure pertubations. However, the delay is limited to ensure proper operation during pressure regulator failure event. Appropriate ACTIONS and Surveillance Requirements have also been added. This change is an additional restriction on plant operation necessary to ensure the design basis accident analysis assumptions are satisfied.

M.2 An additional Function has been added, ITS Table 3.3.6.1-1 Function 3.d. This Function is an additional Drywell Pressure—High Function which isolates the HPCI turbine exhaust vacuum breaker isolation valves coincident with the Reactor Vessel Pressure—Low Function signals. Appropriate ACTIONS and Surveillance Requirements have also been added. This change is an additional restriction on plant operation necessary to ensure the design basis accident analysis assumptions are satisfied.

TECHNICAL CHANGES - MORE RESTRICTIVE (continued)

M.3 The minimum required channels for the Standby Liquid Control System Initiation Function in CTS Table 3.2.A-1 (Functional Unit 4.a) is NA. For the same Function in the ITS (ITS Table 3.3.6.1-1 Function 5.a) the required channels per trip system is specified to be 1. The switch provides trip signal inputs to both trip systems in any position other than "OFF." For this Specification, the SLC initiation switch is considered to provide 1 channel input into each trip system. Since the requirement is more explicit, this change is considered more restrictive on plant operations.

M.4 CTS Table 3.2.A-1 Note (i) requires Function 5.a (RCIC Steam Flow—High) and Functional Unit 6.a (HPCI Steam Flow—High) to be OPERABLE including a time delay of $3 \leq t \leq 9$ seconds. In ITS 3.3.6.1, the RCIC and HPCI Steam Flow Functions are retained as Function 4.a and 3.a, respectively. The time delay feature has been included as a new Function. These Functions have been added as ITS 3.3.6.1 Functions 4.b, RCIC Steam Flow Time Delay, and 3.b, HPCI Steam Flow Time Delay. Surveillances and Required Actions have also been added, consistent with the current requirements for the flow Functions. Since the proposed requirements are explicit to when the Surveillances must be performed, this change is considered more restrictive. This change is consistent with NUREG-1434, Rev. 1.

M.5 CTS Table 4.2.A-1 requires the performance of a CHANNEL CALIBRATION once per 18 months. ITS SR 3.3.6.1.4 requires the performance of a CHANNEL CALIBRATION once per 92 days. This change is consistent with current plant practice. The change represents an additional restriction on plant operation since the more restrictive surveillance frequency of 92 days will be included in Technical Specifications. This change is necessary to ensure the associated instrumentation is maintained OPERABLE.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The detail in CTS 3.2.A Action 2 footnote a, relating to placing channels in trip, is proposed to be relocated to the BASES. The ACTIONS of ITS 3.3.6.1 ensure inoperable channels are placed in trip (which effectively trips the trip system) or remedial actions are taken to compensate for the inoperability as appropriate. As a result, these relocated details are not necessary for ensuring the appropriate actions are taken in the event of inoperable primary containment isolation instrumentation channels. As such, these relocated details are not required to be

TECHNICAL CHANGES - LESS RESTRICTIVE

LA.1 (cont'd) in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LA.2 The detail in CTS Table 3.2.A-1 Note (j) related to the reference setting of the level instrumentation is proposed to be relocated to the UFSAR. This detail is not necessary to ensure the OPERABILITY of the primary containment isolation instrumentation. The requirements of ITS 3.3.6.1 and the Surveillances are adequate to ensure the primary containment isolation instrumentation is maintained OPERABLE. Therefore, the relocated detail is not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the UFSAR will be controlled by the provisions of 10 CFR 50.59.

LA.3 The detail in CTS 3.2.A-1 Note (f) that the Standby Liquid Control System Initiation Function channel closes only reactor water cleanup system isolation valves is proposed to be relocated to the Bases. The requirement in proposed LCO 3.3.6.1 that the primary containment isolation instrumentation for each Function in Table 3.3.6.1-1 shall be OPERABLE, the listed Function for the SLC System Initiation in Table 3.3.6.1-1, and the proposed Surveillances will ensure this Function is maintained OPERABLE. Therefore, the relocated detail is not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LA.4 The requirement in CTS Table 3.2.A-1 footnote (g) that RHR system integrity is maintained provided the piping is intact and no maintenance is being performed that has the potential for draining the reactor vessel through the system is proposed to be relocated to the Bases. The requirement in proposed ITS 3.3.6.1-1 footnote (b) that in MODES 4 and 5, only one channel per trip system with an isolation signal available to one shutdown cooling pump suction isolation valve is required provided RHR Shutdown Cooling System integrity is maintained (see Discussion of Change A.9 for modification of the trip system definition) is sufficient to ensure integrity is maintained. Therefore, the relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

LD.1 The Frequency for performing the LOGIC SYSTEM FUNCTIONAL TEST (LSFT) of CTS 4.2.A.2 (proposed SR 3.3.6.1.6) and the CHANNEL FUNCTIONAL TEST (CFT) for the MSL Tunnel Temperature—High, SLC System Initiation (changed to LSFT in Discussion of Change A.10 above), RCIC Area Temperature, and HPCI Area Temperature—High Functions specified in CTS Table 4.2.A-1 has been extended from 18 months to 24 months. This SR ensures that Isolation Actuation Instrumentation logic will function as designed to ensure proper response during an analyzed event. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24-month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that these tests normally pass their surveillances at the current frequency. An evaluation has been performed using this data and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. Most instrument channels are tested on a more frequent basis during the operating cycle in accordance with CTS 4.2.A.1, the CFT. This testing of the isolation instrumentation ensures that a significant portion of the Isolation Actuation Instrumentation circuitry is operating properly and will detect significant failures of this circuitry. The PCIVs including the actuating logic is designed to be single failure proof and therefore, is highly reliable. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd) Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LE.1 The Frequency for performing the CHANNEL CALIBRATION Surveillance of current Surveillance 4.2.A and Table 4.2.A-1 (proposed SR 3.3.6.1.5) has been extended from 18 months to 24 months. The proposed change will allow this Surveillance to extend the Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). The subject SR ensures that the Isolation instruments will function as designed during an analyzed event. Extending the SR Frequency is acceptable because the Primary Containment Isolation System along with the Isolation initiation logic is designed to be single failure proof and, therefore, is highly reliable. Furthermore, the impacted Isolation instrumentation has been evaluated based on make, manufacturer and model number to determine that the instrumentation's actual drift falls within the design allowance in the associated setpoint calculation. The following paragraphs, listed by CTS Functional Unit number, identify by make, manufacturer and model number the drift evaluations performed:

Functional Unit 1.a: Reactor Vessel Water Level - Low

This function is performed by Rosemount 1153DB4PA Transmitters and 510DU/710DU Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd)

Functional Unit 1.c: Drywell Radiation - High

This function is performed by a General Atomic RD-23 Radiation Detector, General Atomic RP-2CM Radiation Monitor. This instrument was evaluated utilizing a qualitative analysis (i.e., engineering judgment). The results of the analysis support a 24 month fuel cycle surveillance interval extension.

Functional Unit 3.a: Reactor Vessel Water Level - Low Low

This function is performed by Rosemount 1153DB4PA Transmitters and 510DU/710DU Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 3.e: Main Steam Line Tunnel Temperature - High

This function is performed by Patel/Fenwal 01-170020-90 temperature switches. The Patel/Fenwal instruments' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 4.b: Reactor Vessel Water Level - Low

This function is performed by Rosemount 1153DB4PA Transmitters and 510DU/710DU Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 5.c: RCIC Area Temperature - High

This function is performed by United Electric 88B type F7 temperature switches. The thermocouples are not required to be calibrated, therefore, no drift evaluation was performed. The United Electric instruments' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 6.a: HPCI Steam Line Flow - High

This function is performed by Rosemount 1153DB5PA Transmitters and 510DU/710DU Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 6.a: HPCI Steam Line Flow - Timer

This function is performed by Agastat TR14D3B and TR14I3B relays. The Agastat relays' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd)

Functional Unit 6.b: Reactor Vessel Pressure - Low

This function is performed by Rosemount 1153GB7PA Transmitters and 510DU/710DU Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 6.c: HPCI Area Temperature - High

This function is performed by United Electric 88B type F7 temperature switches. The thermocouples are not required to be calibrated, therefore, no drift evaluation was performed. The United Electric instruments' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 7.a: Reactor Vessel Water Level - Low

This function is performed by Rosemount 1153DB4PA Transmitters and 510DU/710DU Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) Based on the design of the instrumentation and the drift evaluations, it is concluded that the impact, if any, on system availability is minimal as a result of the change in the surveillance test interval.

A review of the surveillance test history was performed to validate the above conclusion. This review of the surveillance test history demonstrates that there are no failures that would invalidate the conclusion that the impact, if any, on system availability is minimal from a change to a 24 month surveillance frequency. In addition, the proposed 24 month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications. Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

L.1 CTS Table 3.2.A-1 Action 23 requires the affected system isolation valves to be closed within one hour. An additional Action has been added (proposed ITS 3.3.6.1 ACTION G) if the associated penetration is not isolated within the specified Completion Time. The Required Actions are to be in MODE 3 in 12 hours and MODE 4 in 36 hours. Currently, if this action were not met entry into CTS 3.0.C is required and the plant must within one hour take ACTION to place the unit in a MODE in which the Specification does not apply by placing the plant in MODE 3 in the next 12 hours, and be in at least MODE 4 within the subsequent 24 hours. Since, the proposed Required Actions do not impose the additional requirement to begin the plant shutdown within an hour, this change is considered less restrictive but is acceptable since isolation capability is not necessarily lost under the proposed ACTIONS and since the proposed default times are consistent with current times for other primary containment inoperabilities. Proposed ITS 3.3.6.1 ACTION G is required to be entered when the Required Action and associated Completion Time for Condition F (isolate the affected penetration flow path within 1 hour) is not met or as required by Required Action C.1 and referenced in Table 3.3.6.1-1. Therefore, entry is required when the channels are not restored within the specified Completion Times of Required Actions A.1 and A.2 (12 hours and 24 hours, respectively) or isolation capability is lost (Condition B).

L.2 The Applicability of the Standby Liquid Control (SLC) System Initiation Function has been modified from MODES 1, 2 and 3 to MODES 1 and 2, only. The reduction in the Applicability is acceptable since with the unit in MODE 3 the reactor will be shutdown with all control rods inserted. Therefore, the

TECHNICAL CHANGES - LESS RESTRICTIVE

L.2 (cont'd) additional shutdown requirements of the SLC System will not be necessary to mitigate an ATWS event. The proposed Applicability is consistent with the Applicability of ITS 3.1.7 for the SLC System. In addition, CTS Table 3.2.A-1 ACTION 23 (Close the affected system isolation valves within one hour and declare the affected system inoperable) for this Function has been changed to either close the penetration or declare the system inoperable (ITS 3.3.6.1 Required Action I.1 and I.2, respectively). The purpose of the SLC System Initiation Function of the RWCU System (ITS Table 3.3.6.1-1 Function 5.a) is to ensure the SLC System functions properly and the injected boron is not removed from the Reactor Coolant System. With the RWCU System isolated, the SLC System remains capable of performing its function. With the RWCU System not isolated and the SLC System Initiation Function inoperable, the SLC System cannot perform its function. With the SLC System declared inoperable, the Actions of CTS 3.4.A (ITS 3.1.7), which have been previously approved by the NRC, would apply. Therefore, this change is considered acceptable since the Required Actions in ITS 3.1.7 provide adequate compensatory action for other conditions where the SLC System is inoperable (SLC tank sodium pentaborate concentration not within limits). This change is consistent with BWR ISTS, NUREG-1433, Rev.1.

L.3 The CTS 3.2.A-1 ACTION 23 requirement, associated with the Reactor Vessel Water Level - Low Function (CTS 3.2.A-1 Functional Unit 7.a), to close the affected system isolation valves within one hour and declare the affected system inoperable has been modified to immediately initiate action to restore the channel to OPERABLE status or initiate action to isolate the Residual Heat Removal (RHR) Shutdown Cooling System (ITS 3.3.6.1 Required Action I.1 and I.2, respectively). The current actions are overly restrictive and may not always be the safest action. Isolating the RHR suction pathway will place the system in a state in which it can not be used. Therefore, the ability of the plant to remove decay heat would be reduced. As a result, the proposed Actions are designed to require the most prudent action. The actions will be required to be initiated immediately and continue until the channels are restored or the RHR Shutdown Cooling System is isolated. When the RHR Shutdown Cooling System is isolated it must be declared inoperable and further actions will be required to provide alternate decay heat removal methods as required by ITS 3.4.7 during MODE 3, ITS 3.4.8 during MODE 4, and ITS 3.9.8 and 3.9.9 during MODE 5 operations. If Required Action I.1 is chosen prudent action must be taken to restore the channels, however the system can remain in operation to support the decay heat removal requirements.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.4 CTS Table 3.2.A-1 Action 21, which requires the unit to be in STARTUP (Mode 2) with the associated isolation valves closed within 8 hours, is being changed in ITS 3.3.6.1 ACTION D to only require isolation of the associated main steam line within 12 hours. The requirement to isolate the affected main steam lines is a sufficient action with the Main Steam Line Isolation - Reactor Vessel Water Level—Low Low, Main Steam Line Flow—High, and Main Steam Line Tunnel Temperature—High Functions inoperable and will normally require being in MODE 2 to avoid a scram. The requirement to be in MODE 2 is therefore implicit and is not included in ITS 3.3.6.1 Required Action D.1. In addition, some conditions may affect the isolation logic for only one main steam line. In these cases, it is not necessary to require a shutdown of the unit; rather, isolation of the affected line returns the system to a status where it can perform the remainder of the isolation function, and continued operation is allowed. The time allowed to isolate the associated main steam lines is extended from the CTS time of 8 hours to 12 hours in ITS 3.3.6.1 Required Action D.1. The additional time is provided to allow for more orderly power reduction.

RELOCATED SPECIFICATIONS

None

3.2 - LIMITING CONDITIONS FOR OPERATION

A. Isolation Actuation

LCO 3.3.6.2

The isolation actuation instrumentation CHANNEL(s) shown in Table 3.2.A-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column.

Allowable Value

A.6

APPLICABILITY:

add proposed ACTIONS Note

A.2

As shown in Table 3.2.A-1.

ACTION:

ACTIONS A and B

1. With an isolation actuation instrumentation CHANNEL trip setpoint less conservative than the value shown in the Trip Setpoint column of Table 3.2.A-1, declare the CHANNEL inoperable until the CHANNEL is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

Allowable Value

A.6

2. ~~With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement for one TRIP SYSTEM, place the inoperable CHANNEL(s) and/or TRIP SYSTEM in the tripped condition[a] within one hour.~~

add CTS 3.2.A Actions 2

A.3

4.2 - SURVEILLANCE REQUIREMENTS

A. Isolation Actuation

Note 1 to Surveillance Requirements

1. Each isolation actuation instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL MODE(s) and at the frequencies shown in Table 4.2.A-1.

SR 3.3.6.2.6

2. LOGIC SYSTEM FUNCTIONAL TEST(s) of all CHANNEL(s) shall be performed at least once per 18 months.

24

LD.1

Insert CTS 3.2.A Note a

A.3

~~[a] An inoperable CHANNEL need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, the inoperable CHANNEL shall be restored to OPERABLE status within 2 hours or the ACTION required by Table 3.2.A-1 for that trip function shall be taken.~~

A.1

ITS 3.3.6.2

3.2 - LIMITING CONDITIONS FOR OPERATION

4.2 - SURVEILLANCE REQUIREMENTS

3. ~~With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement for both TRIP SYSTEMS, place at least one TRIP SYSTEM(b) in the tripped condition(c) within one hour and take the ACTION required by Table 3.2.A-1.~~

Insert CTS 3.2.A Action 2

A.3

A.3

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b ~~If more CHANNEL(s) are inoperable in one TRIP SYSTEM then in the other, select the TRIP SYSTEM with the greater number of inoperable CHANNEL(s) to place in the tripped condition except when this would cause the trip function to occur. If both TRIP SYSTEM(s) have the same number of inoperable CHANNEL(s), place either TRIP SYSTEM in the tripped condition.~~

c ~~An inoperable CHANNEL need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, the inoperable CHANNEL shall be restored to OPERABLE status within one hour or the ACTION required by Table 3.2.A-1 for that trip function shall be taken.~~

A.3

A.3

ITS 3.3.6.2

Insert CTS 3.2.A Action 2

Insert 5, Pages 3/4.2-1, 3/4.2-2

2. With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement:

ACTION B

a) Within 1 hour, verify sufficient CHANNELS remain OPERABLE or in the tripped condition to ensure automatic isolation capability.

ACTION A

b) Within 12 hours, place the inoperable CHANNEL(s) and/or TRIP SYSTEM in the tripped condition[a] for Table 3.2.A-1 Functional Units common to RPS: 1a, 1b, 2a, 2b, 3a, 3b, 4b, and 7a and

see ITS 3.3.6.1

c) Within 24 hours, place the inoperable CHANNEL(s) and/or TRIP SYSTEM in the tripped condition[a] for Table 3.2.A-1 Functional Units not common to RPS.

OR

ACTION C

Take the ACTION required by Table 3.2.A-1.

A.3

Insert CTS 3.2.A Note a

LA.1

a An inoperable channel need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to OPERABLE status within the required time, the ACTION required by Table 3.2.A-1 for the Functional Unit shall be taken.

ACTION C

Page 3 of 10

3.3.6.2-1

TABLE 3.2.A-1

ISOLATION ACTUATION INSTRUMENTATION

<See ITS 3.3.6.1>

A.6 Allowable Value

LA.2

Functional Unit	~~Trip Setpoint~~$^{(f)}$	Minimum CHANNEL(s) per TRIP SYSTEM$^{(a)}$	Applicable OPERATIONAL MODE(s)	ACTION
1. PRIMARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level - Low	≥144 inches	2	1, 2, 3	20
b. Drywell Pressure - High$^{(d)}$	≤2.5 psig	2	1, 2, 3	20
c. Drywell Radiation - High	≤100 R/hr	1	1, 2, 3	23
2. SECONDARY CONTAINMENT ISOLATION	LF.1			
1 a. Reactor Vessel Water Level - Low$^{(c)(k)}$	≥144 inches	2	1, 2, 3 & ~~(e)~~ L.1	C 24
2 b. Drywell Pressure - High$^{(c)(d,k)}$	≤2.5 psig	2	1, 2, 3	C 24
3 c. Reactor Building Ventilation Exhaust Radiation - High$^{(c)(k)}$	≤10 mR/hr	2	1, 2, 3 & **	C 24
4 d. Refueling Floor Radiation - High$^{(c)(k)}$	≤100 mR/hr	2	1, 2, 3 & **	C 24
3. MAIN STEAM LINE (MSL) ISOLATION				
a. Reactor Vessel Water Level - Low Low	≥84 inches	2	1, 2, 3	21
b. MSL Tunnel Radiation - High$^{(h)}$	≤15$^{(h)}$ x normal background	2	1, 2, 3	21
c. MSL Pressure - Low	≥825 psig	2	1	22
d. MSL Flow - High$^{(k)}$	≤140% of rated	2/line	1, 2, 3	21
e. MSL Tunnel Temperature - High	≤200°F	2 of 4 in each of 2 sets	1, 2, 3	21

<See ITS 3.3.6.1>

A.1

M.1

add CORE ALTERATIONS L.1

add during OPDRVs

M.2

ITS 3.3.6.2

Page 4 of 10

A.1

ITS 3.3.6.2

TABLE 3.2.A-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION

ACTION

<see ITS 3.3.6.1>

ACTION 20 - Be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

ACTION 21 - Be in at least STARTUP with the associated isolation valves closed within 8 hours or be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

ACTION 22 - Be in at least STARTUP within 8 hours.

ACTION 23 - Close the affected system isolation valves within one hour and declare the affected system inoperable.

ACTION C

ACTION 24 - Establish SECONDARY CONTAINMENT INTEGRITY with the standby gas treatment system operating within one hour.

A.4

add proposed Required Actions C.1.2 and C.2.2

L.2

Page 5 of 10

A.1

ITS 3.3.6.2

TABLE 3.2.A-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION

L.1

add CORE ALTERATIONS M.1

TABLE NOTATION

Note (a) to Table 3.3.6.2-1 * During CORE ALTERATIONS or operations with a potential for draining the reactor vessel. A.3

Note (b) to Table 3.3.6.2-1 ** When handling irradiated fuel in the secondary containment.

Insert CTS Table 3.2.A-1 Note (a)

(a) A CHANNEL may be placed in an inoperable status for up to 2 hours for required surveillance without placing the CHANNEL in the tripped condition provided the Functional Unit maintains isolation actuation capability.

(b) Also trips the mechancal vacuum pump and isolates the steam jet air ejectors. <see ITS 3.3.6.1>

(c) Isolates the reactor building ventilation system and actuates the standby gas treatment system. LA.3

(d) This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required. A.5

(e) Only one TRIP SYSTEM. <see ITS 3.3.6.1>

(f) Closes only reactor water cleanup system isolation valves.

(g) Only one trip system requied in OPERATIONAL MODE(s) 4 and 5 with RHR Shutdown Cooling System integrity maintained. System integrity is maintained provided the piping is intact and no maintenance is being performed that has the potential for draining the reactor vessel through the system.

(h) Normal background is as measured during full power operation without hydrogen being injected.

(i) Includes a time delay of $3 \leq t \leq 9$ seconds.

LA.2

(j) Reactor vessel water level settings are expressed in inches above the top of active fuel (which is 360 inches above vessel zero).

(k) Also isolates the control room ventilation system. <see ITS 3.3.6.1>

A.3

Insert 6, Page 3/4.2-7

(a) When a CHANNEL is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required ACTIONs may be delayed for up to 6 hours provided the Functional Unit maintains isolation actuation capability.

Note 2
to Surveillance
Requirements

Table 3.3.6.2-1

TABLE 4.2.A-1

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Functional Unit ⟨See ITS 3.3.6.1⟩	SR 3.3.6.2.1 CHANNEL CHECK	SR 3.3.6.2.2 CHANNEL FUNCTIONAL TEST	SR 3.3.6.2.3 SR 3.3.6.2.4 SR 3.3.6.2.5 CHANNEL CALIBRATION	Applicable OPERATIONAL MODE(s)
1. PRIMARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level - Low	S	M	$E^{(a)}$	1, 2, 3
b. Drywell Pressure - High$^{(b)}$	NA	M	Q	1, 2, 3
c. Drywell Radiation - High	S	M	E	1, 2, 3
2. SECONDARY CONTAINMENT ISOLATION LA.3		A.3	24 months LE.1	
1 a. Reactor Vessel Water Level - Low	S -1	~~M~~ Q -2	5 ~~$E^{(a)}$~~ 3	1, 2, 3 & * L.1
2 b. Drywell Pressure - High ⟨see ITS 3.3.6.1⟩	NA	~~M~~ Q -2	Q -4	1, 2, 3
3 c. Reactor Building Ventilation Exhaust Radiation - High ⟨see ITS 3.3.6.1⟩	S -1	~~M~~ Q -2	Q -4	1, 2, 3 & **
4 d. Refueling Floor Radiation - High LA.3	S -1	~~M~~ Q -2	Q -4	1, 2, 3 & **
3. MAIN STEAM LINE (MSL) ISOLATION				
a. Reactor Vessel Water Level - Low Low	S	M	$E^{(a)}$	1, 2, 3
b. MSL Tunnel Radiation - High	S	M	$E^{(a)}$	1, 2, 3
c. MSL Pressure - Low	NA	M	Q	1
d. MSL Flow - High$^{(a)}$	S	M	E	1, 2, 3
e. MSL Tunnel Temperature - High	NA	E	E	1, 2, 3

⟨See ITS 3.3.6.1⟩

A.1

* A.5

add CORE ALTERATIONS M.1

add during OPDRVs M.2

ITS 3.3.6.2

Page 8 of 10

ITS 3.3.6.2

A.1

TABLE 4.2.A-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

L.1

add CORE ALTERATIONS — M.1

TABLE NOTATION

Note (a) to Table 3.3.6.2-1 * During CORE ALTERATIONS or operations with a potential for draining the reactor vessel.

Note (b) to Table 3.3.6.2-1 ** When handling irradiated fuel in the secondary containment.

92 — A.3

SR 3.3.6.2.3
SR 3.3.6.2.5 (a) Trip units are calibrated at least once per ~~31~~ days and transmitters are calibrated at the frequency identified in the table.

(b) This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required. — A.5

(c) Isolates the reactor building ventilation system and actuates the standby gas treatment system. — LA.3

(d) Also isolates the control room ventilation system. — <see ITS 3.3.6.1>

(e) These instrument channels will be calibrated using simulated electrical signals once every three months. In addition, calibration including the sensors will be performed every 18 months.

<see ITS 3.3.6.1>

A.1

ITS 3.3.6.2

3.7 - LIMITING CONDITIONS FOR OPERATION

3. With both standby gas treatment subsystems inoperable in OPERATIONAL MODE *, suspend handling of irradiated fuel in the secondary containment, CORE ALTERATION(s), and operations with a potential for draining the reactor vessel. The provisions of Specification 3.0.C are not applicable.

4.7 - SURVEILLANCE REQUIREMENTS

c. Verifying a subsystem flow rate of 4000 cfm ± 10% during system operation when tested in accordance with ANSI N510-1980.

3. After every 1440 hours of charcoal adsorber operation by verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, meets the laboratory testing criteria of ASTM-D-3803-89, for a methyl iodide penetration of <2.5%, when tested at 30°C and 70% relative humidity.

4. At least once per 18 months by: 24 LD.1

See ITS 3.6.4.3

a. Verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is <6 inches water gauge while operating the filter train at a flow rate of 4000 cfm ± 10%.

b. Verifying that the filter train starts and isolation dampers open on each of the following test signals:

   1) Manual initiation from the control room, and

SR 3.3.6.2.6

   2) Simulated automatic initiation signal. LA.4

c. Verifying that the heaters dissipate 30 ± 3 kw when tested in accordance with ANSI N510-1989. This reading shall include the appropriate correction for variations in voltage.

* When handling irradiated fuel in the secondary containment, during CORE ALTERATION(s), and operations with a potential for draining the reactor vessel.

ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 This proposed change to the CTS 3.2.A Actions provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3, "Completion Times," the ITS 3.3.6.2 ACTIONS Note ("Separate Condition entry is allowed for each....") and the wording for ACTION A ("One or more channels...") and ACTION B ("One or more Functions...") provide direction consistent with the intent of the existing Action for an inoperable isolation instrumentation channel. It is intended that each inoperable channel is allowed a certain time to complete the Required Actions. Since this change only provides more explicit direction of the current interpretation of the existing specifications, this change is considered administrative.

A.3 These changes to CTS 3/4.2.A are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 27, 1999. The changes identified are consistent with the allowances in NEDC-31677-P-A, "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation," July 1980, and NEDC-30851P-A Supplement 2, "Technical Specifications Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," March 1989. As such, these changes are administrative.

A.4 CTS Table 3.2.A-1 Action 24 has been changed by replacing the use of the term SECONDARY CONTAINMENT INTEGRITY with the elements of that term and clarifies the need to isolate SCIVs and start the associated SGT subsystem(s). The change is editorial in that all the individual requirements are specifically addressed by ITS 3.3.6.2 Required Actions C.1.1 and C.2.1. Therefore the change is a presentation preference adopted by the BWR ISTS, NUREG-1433, Rev. 1. Refer also to the Discussion of Changes associated with the Definitions Section which addresses deletion of the SECONDARY CONTAINMENT INTEGRITY definition.

ADMINISTRATIVE (continued)

A.5 CTS Table 3.2.A-1 Note (d) and CTS Table 4.2.A-1 Note (b) state that the Drywell Pressure—High Function (Functional Unit 2.b) is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required in MODE 2 (i.e., when Special Test Exception 3.12.A is being used). These notes are deleted from CTS Table 3.2.A-1 and 4.2.A-1 since the only applicable condition in which these notes would be needed has been deleted (see Discussion of Changes for CTS: 3/4.12.A, in ITS Section 3.10). Therefore, Note (d) of CTS Table 3.2.A-1 and Note (b) of CTS Table 4.2.A-1 are no longer required and the change is considered administrative.

A.6 CTS 3.2.A requires the isolation actuation instrumentation setpoints to be set consistent with the Trip Setpoint values shown in Table 3.2.A-1. CTS 3.2.A Action 1 requires the CHANNEL to be declared inoperable when the setpoint is less conservative than the value shown in the Trip Setpoint column of Table 3.2.A-1. Table 3.2.A-1 includes a "Trip Setpoint" column. It is proposed to re-label this column as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1 (ISTS Table 3.3.6.2-1). In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS Table 3.2.A-1 are applied as the Operability limit for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual trip setpoints specified in CTS Table 3.2.A-1 for the isolation actuation instrumentation Functions or the Allowable Values specified in ITS Table 3.3.6.2-1 (see Discussion of Change LF.1 below for proposed changes to the Trip Setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 The Applicability for CTS Table 3.2.A-1 and 4.2.A-1 Functional Units 2.c and 2.d have been revised to include CORE ALTERATIONS as indicated in ITS Table 3.3.6.2-1 footnote (b). This proposed Applicability is consistent with the Applicability for the Standby Gas Treatment System in CTS 3.7.P (ITS 3.6.4.3). This change is more restrictive but necessary to ensure radiation releases due to postulated fuel failures (due to a postulated dropped fuel assembly during CORE ALTERATIONS) are maintained within analysis assumptions.

TECHNICAL CHANGES - MORE RESTRICTIVE (continued)

M.2 The Applicability for CTS Table 3.2.A-1 and 4.2.A-1 Functional Units 2.c and 2.d have been revised to include when performing operations that have a potential for draining the reactor vessel, as indicated in ITS Table 3.3.6.2-1 Note (a). This proposed Applicability, for ITS Table 3.3.6.2-1 Functions 3 and 4, is consistent with the Applicability for the Standby Gas Treatment Systems in CTS 3.7.P (ITS 3.6.4.3). This change represents an additional restriction on plant operation necessary to ensure offsite dose limits are not exceeded if core damage occurs during an inadvertent drain down event.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The detail in CTS 3.2.A Action 2 footnote a, relating to placing channels in trip, is proposed to be relocated to the Bases. The ACTIONS of ITS 3.3.6.2 ensure inoperable channels are placed in trip (which effectively trips the trip system) or remedial actions are taken to compensate for the inoperability, as appropriate. As a result, these relocated details are not necessary for ensuring the appropriate actions are taken in the event of inoperable secondary containment isolation channels. As such, these relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LA.2 The detail in CTS Table 3.2.A-1 Note (j) related to the reference setting of the reactor vessel water level instrumentation is proposed to be relocated to the UFSAR. This detail is not necessary to ensure the OPERABILITY of the secondary containment isolation instrumentation. The requirements of ITS 3.3.6.2 and the Surveillances are adequate to ensure the reactor vessel water level instrumentation for secondary containment isolation is maintained OPERABLE. Therefore, the relocated detail is not required to be in the ITS to provide adequte protection of the public health and safety. Changes to the UFSAR will be controlled by the provisions of 10 CFR 50.59.

LA.3 System design and operational details of current Table 3.2.A-1 and 4.2.A-1 Note (c) are proposed to be relocated to the Bases. Details relating to system design and operation (e.g., specific valves and systems affected) are unnecessary in the LCO. These details are not necessary to ensure the OPERABILITY of the

TECHNICAL CHANGES - LESS RESTRICTIVE

LA.3 (cont'd) secondary containment isolation instrumentation. The requirements of ITS 3.3.6.2 and the associated Surveillance Requirements are adequate to ensure the secondary containment isolation instruments are maintained OPERABLE. Therefore, the relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LA.4 The details in CTS 4.7.P.4.b.2 relating to methods for performing the LOGIC SYSTEM FUNCTIONAL TEST (simulated automatic operation) and the system functional test of SGT system (use of simulated signals), respectively, are proposed to be relocated to the Bases. These details are not necessary to ensure the OPERABILITY of the secondary containment isolation instrumentation. The requirements of ITS 3.3.6.2 and the associated Surveillance Requirements are adequate to ensure the secondary containment isolation instruments are maintained OPERABLE. Therefore, the relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LD.1 The Frequency for performing the LOGIC SYSTEM FUNCTIONAL TEST of CTS 4.2.A.2 and CTS 4.7.P.4.b (proposed SR 3.3.6.2.6) has been extended from 18 months to 24 months. These SRs ensure that Secondary Containment Isolation Instrumentation and Standby Gas Treatment (SGT) actuation logic will function as designed to ensure proper response during an analyzed event. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that these tests normally pass their Surveillances at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. The SCIVs and SGT System including the automatic actuating

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd) logic is designed to be single failure proof, and therefore, is highly reliable. In addition, major deviations in the instrumentation during the operating cycle will be detected since other surveillances are performed such as the CHANNEL CHECK and CHANNEL FUNCTIONAL TEST (proposed SRs 3.3.6.2.1 and 3.3.6.2.2) at a more frequent basis. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24-month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LE.1 The Frequency for performing the CHANNEL CALIBRATION of CTS 4.2.A.1 as specified in CTS Table 4.2.A-1 (proposed SR 3.3.6.2.5) has been extended from 18 months to 24. The subject SR ensures that the Secondary Containment Isolation Instrumentation will function as designed during an analyzed event. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Extending the SR Frequency is acceptable because the isolation initiation logic is designed to be single failure proof, and therefore, is highly reliable. Furthermore, the impacted isolation instrumentation has been evaluated based on make, manufacturer, and model number to determine that the instrumentation's actual drift falls within the design allowance in the associated setpoint calculation. The following paragraph, listed by CTS Functional Unit number, identifies by make, manufacturer and model number the drift evaluation performed:

Functional Unit 2.a: Reactor Vessel Water Level - Low

This function is performed by Rosemount 1153DB4 Transmitters and 510DU/710DU Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Based on the design of the instrumentation and the drift evaluations, it is concluded that the impact, if any, on system availability is minimal as a result of the change in the surveillance test interval.

A review of the surveillance test history was performed to validate the above conclusion. This review of the surveillance test history demonstrates that there are no failures that would invalidate the conclusion that the impact, if any, on system availability is minimal from a change to a 24-month surveillance frequency. In addition, the proposed 24-month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor document performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

L.1 CTS Tables 3.2.A-1 and 4.2.A-1 Functional Unit 2.a, Reactor Vessel Water Level—Low, is required to be Operable during CORE ALTERATIONS and operations with a potential for draining the reactor vessel as stated in Note * to the Table. Automatic secondary containment isolation capabilities on reactor vessel water level decreases are not necessary during CORE ALTERATIONS. CORE ALTERATIONS do not result in any increased potential for vessel draindown. If ongoing activities do involve a potential for draining the reactor vessel, the Applicability of ITS Table 3.3.6.2-1 Function 1 will still require the Reactor Vessel Water Level—Low Function to be OPERABLE. Therefore, the ITS will not include the Applicability of CORE ALTERATIONS for this Function.

L.2 New Required Actions have been added to CTS Table 3.2.A-1 Action 24 (ITS 3.3.6.2 Required Actions C.1.2 and C.2.2) to require declaring the affected components inoperable and taking the appropriate actions in the associated Secondary Containment Isolation Valve (SCIV) or SGT Systems Specification if the associated penetrations and SGT subsystems are not placed in the proper condition within 1 hour. Currently, if the SCIV(s) and SGT subsystem(s) are not placed in the proper condition, a CTS 3.0.C entry would be required, since no further Actions are provided. Since this instrumentation provides a signal for the SCIVs and SGT System (i.e., it supports SCIVs and SGT System OPERABILITY), it is appropriate that the proper action would be to declare the associated SCIVs and SGT subsystems inoperable. The current requirements are overly restrictive, in that if the associated SCIVs and SGT subsystems were inoperable for other reasons, a much longer restoration time is provided.

RELOCATED SPECIFICATIONS

None

ITS 3.3.6.3

A.1

PRIMARY SYSTEM BOUNDARY

Instrumentation

Relief Valve~~s~~ 3/4.6.F

A.1

A.2

3.6 - LIMITING CONDITIONS FOR OPERATION

F. Relief Valve~~s~~ Instrumentation

LCO 3.3.6.3

Table 3.3.6.3-1 Function 1.b

5 reactor coolant system relief valves and the reactuation time delay of two relief valves shall be OPERABLE with the following settings:

A.3

Table 3.3.6.3-1 Function 1a and 2.a

Relief Function ~~Setpoint~~ (psig) Allowable Value

LF.1

Open
≤1115 psig
≤1115 psig
≤1135 psig
≤1135 psig
≤1135 psig[a]

<see ITS 3.4.3>

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 and 3.

ACTION:

1. With one or more relief valves open, provided that suppression pool average water temperature is <110°F, take action to close the open relief valve(s); if suppression pool average water temperature is ≥110°F place the reactor mode switch in the Shutdown position.

<See ITS 3.4.3>

4.6 - SURVEILLANCE REQUIREMENTS

F. Relief Valve~~s~~

Add proposed SR 3.3.6.3 Note

Table 3.3.3.6.3-1 Functions 1.a and 2.a

Table 3.3.3.6.3-1 Function 1.b

1. The relief valve function and the reactuation time delay function instrumentation shall be demonstrated OPERABLE by performance of a:

A.4

a. ~~CHANNEL FUNCTIONAL TEST of the relief valve function at least once per 18 months, and a~~

24 LD.1

SR 3.3.6.3.1
SR 3.3.6.3.2

b. CHANNEL CALIBRATION and LOGIC SYSTEM FUNCTIONAL TEST of the entire system at least once per 18 months.

24 LD.1 LE.1

2. ~~Deleted.~~

M.1

Add proposed Table 3.3.6.3-1 Function 1.b time delay Allowable Value

<see ITS 3.4.3>

---

[a] ~~Target Rock combination safety/relief valve.~~

Page 1 of 2

3.6 - LIMITING CONDITIONS FOR OPERATION

4.6 - SURVEILLANCE REQUIREMENTS

ACTION A

2. With the relief valve function and/or the reactuation time delay of one of the above required reactor coolant system relief valves inoperable, restore the inoperable relief valve function and the reactuation time delay function to OPERABLE status within 14 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

ACTION B

ACTION B

3. With the relief valve function and/or the reactuation time delay of more than one of the above required reactor coolant system relief valves inoperable, be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

4. Deleted.

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ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 A Note has been added to CTS 4.6.F (Surveillance Requirements of ITS 3.3.6.3) to provide direction for proper application of the Surveillance Requirements to ensure Technical Specification compliance. The proposed change does not modify any requirements, and serves only to provide direction regarding the presentation of requirements. This change is consistent with BWR ISTS, NUREG-1433, Revision 1. This change represents a presentation preference only and is, therefore, considered administrative.

A.3 CTS 3.6.F requires the Reactor Coolant System Relief Valves to have settings consistent with the Relief Valve Setpoints specified in CTS 3.6.F. This includes the opening setpoints. It is proposed to re-label these "Setpoints" as "Allowable Values" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1 (ISTS Table 3.3.6.3-1). In accordance with current plant procedures and practices, the Setpoints specified in CTS 3.6.F are applied as the Operability limits for the associated instruments. Therefore, the use of the term "Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual setpoints specified in CTS 3.6.F for the Reactor Coolant System Relief Valve actuation instrumentation Functions or the Allowable Values specified in ITS Table 3.3.6.3-1 (see Discussion of Change LF.1 below for proposed changes to the Setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

A.4 CTS 4.6.F.1.a requires performance of a CHANNEL FUNCTIONAL TEST (CFT) of the relief valve function at least once per 18 months (changed to 24 months - see Discussion of Change LD.1). In addition, CTS 4.6.F.1.b requires performance of a CHANNEL CALIBRATION and a LOGIC SYSTEM FUNCTIONAL TEST (LSFT) of the entire system at least once per 18 months (changed to 24 months - see Discussion of Change LD.1 below). Since the relief valve function logic only includes one channel for each relief valve, the CFT is redundant to the LSFT. Therefore, the CFT has been deleted. The proposed

ADMINISTRATIVE

A.4 (cont'd) LSFT (ITS SR 3.3.6.3.2) will test all components in the actuation logic of each relief valve. Since the testing requirements are not altered, this change is considered a presentation preference only. As such, this change is considered administrative.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS 3.6.F and CTS 4.6.F.1 require the OPERABILITY of the reactuation time delay function instrumentation, but do not specify an Allowable Value for the time delay. Proposed ITS Table 3.3.6.3-1 Function 1.b includes an Allowable Value for the time delay to ensure the OPERABILITY of the low set relief function. The Allowable Value has been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). The methodologies used are consistent with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA S67.04-Part II-1994. The proposed Allowable Value is based on the assumption of a 24 month calibration interval (plus an additional allowance of 25%) in the determination of the magnitude of equipment drift in the setpoint analysis. This change represents an additional restriction on plant operation.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LD.1 The Frequency for performing the LOGIC SYSTEM FUNCTIONAL TEST for CTS 4.6.F.1.b (ITS SR 3.3.6.3.2), including the CHANNEL FUNCTIONAL TEST for CTS 4.6.F.1.a, has been extended from 18 months to 24 months. This change extends the testing associated with the relief valve function and the reactuation time delay function. This SR ensures that the Relief Valve Instrumentation logic will function as designed to ensure proper response during analyzed events. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24-month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd) historical maintenance and surveillance data have shown that these tests normally pass their surveillances at the current frequency. An evaluation has been performed using this data and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the inherent system and component reliability, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LE.1 The Frequency for performing the CHANNEL CALIBRATION Surveillance of CTS 4.6.F.1.b (ITS SR 3.3.6.3.1) has been extended from 18 months to 24 months. This Surveillance ensures that the Relief Valve Instrumentation will function as designed to ensure proper response during analyzed events. The proposed change will allow this Surveillance to extend the Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) Extending the SR Frequency is acceptable because the relief valve instrumentation logic is designed to be single failure proof, and therefore, is highly reliable. Furthermore, the Relief Valve Instrumentation has been evaluated based on make, manufacturer and model number to determine that the instrumentation's actual drift falls within the design allowance in the associated setpoint calculation. The following paragraphs, listed by CTS Function name, identify by make, manufacturer and model number the drift evaluations performed:

Reactor Vessel Pressure Setpoint

This function is performed by Dresser 1539VX pressure controllers. An increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Dresser pressure controllers with respect to drift. The Dresser pressure controllers' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Low Set Relief Valve Reactuation Time Delay

This function is performed by Agastat E7022PC003 and E7022PC002 time delay relays. An increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the time delay relays with respect to drift. A sufficient quantity of As Found and As Left calibration data was not available to perform a rigorous drift analysis. The vendors drift specification will be used to calculate a 30 month drift. The calculated 30 month drift will be used in the development of the plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Based on the design of the instrumentation, number of redundant relief valves, and the drift evaluations, it is concluded that the impact, if any, from this change on system availability is minimal as a result of the change in the surveillance test interval. A review of historical surveillance data was performed to validate the above conclusion. This review of surveillance test history demonstrates that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequency, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) does not invalidate any assumptions in the plant licensing basis.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

None

RELOCATED SPECIFICATIONS

None

ITS 3.3.7.1

A.1

3.2 - LIMITING CONDITIONS FOR OPERATION

A. Isolation Actuation

LCO 3.3.7.1 The isolation actuation instrumentation CHANNEL(s) shown in Table 3.2.A-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the ~~Trip Setpoint~~ column.

Allowable Value A.2

APPLICABILITY:

As shown in Table 3.2.A-1.

ACTION:

add proposed ACTIONS Note A.3

ACTION A

1. With an isolation actuation instrumentation CHANNEL trip setpoint less conservative than the value shown in the ~~Trip Setpoint~~ column of Table 3.2.A-1, declare the CHANNEL inoperable until the CHANNEL is restored to OPERABLE status with its trip setpoint adjusted consistent with the ~~Trip Setpoint~~ value.

Allowable Value A.2

2. ~~With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement for one TRIP SYSTEM, place the inoperable CHANNEL(s) and/or TRIP SYSTEM in the tripped condition^(a) within one hour.~~

Insert CTS 3.2.A Action 2. A.4

4.2 - SURVEILLANCE REQUIREMENTS

A. Isolation Actuation

Note 1 to Surveillance Requirements

1. Each isolation actuation instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL MODE(s) and at the frequencies shown in Table 4.2.A-1.

SR 3.3.7.1.6

2. LOGIC SYSTEM FUNCTIONAL TEST(s) of all CHANNEL(s) shall be performed at least once per ~~18~~ 24 months. LD.1

Insert CTS 3.2.a footnote (a) A.4

~~a An inoperable CHANNEL need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, the inoperable CHANNEL shall be restored to OPERABLE status within 2 hours or the ACTION required by Table 3.2.A-1 for that trip function shall be taken.~~

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A.1

ITS 3.3.7.1

3.2 - LIMITING CONDITIONS FOR OPERATION

4.2 - SURVEILLANCE REQUIREMENTS

~~3. With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement for both TRIP SYSTEMS, place at least one TRIP SYSTEM(b) in the tripped condition(c) within one hour and take the ACTION required by Table 3.2.A-1.~~

Insert CTS 3.2.A Action 3 – A.4

A.4

~~b If more CHANNEL(s) are inoperable in one TRIP SYSTEM than in the other, select the TRIP SYSTEM with the greater number of inoperable CHANNEL(s) to place in the tripped condition except when this would cause the trip function to occur; if both TRIP SYSTEM(s) have the same number of inoperable CHANNEL(s), place either TRIP SYSTEM in the tripped condition.~~

~~c An inoperable CHANNEL need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, the inoperable CHANNEL shall be restored to OPERABLE status within one hour or the ACTION required by Table 3.2.A-1 for that trip function shall be taken.~~

A.4

Page 2 of 9

A.4

Insert CTS 3.2.A Action 2 ITS 3.3.7.1

Insert 5, Pages 3/4.2-1, 3/4.2-2

ACTIONS A, B, and C

2. With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per TRIP SYSTEM requirement:

Required Action B.1 and C.1

a) Within 1 hour, verify sufficient CHANNELS remain OPERABLE or in the tripped condition to ensure automatic isolation capability.

Required Action C.2

b) Within 12 hours, place the inoperable CHANNEL(s) and/or TRIP SYSTEM in the tripped condition[(a)] for Table 3.2.A-1 Functional Units common to RPS: 1a, 1b, 2a, 2b, 3a, 3b, 4b, and 7a, and

<See ITS 3.3.6.1>

Required Action B.2

c) Within 24 hours, place the inoperable CHANNEL(s) and/or TRIP SYSTEM in the tripped condition[(a)] for Table 3.2.A-1 Functional Units not common to RPS.

OR

ACTION D

Take the ACTION required by Table 3.2.A-1.

A.4

Insert CTS 3.2.A Note a

LA.1

a An inoperable channel need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to OPERABLE status within the required time, the ACTION required by Table 3.2.A-1 for the Functional Unit shall be taken.

ACTION D

ITS 3.3.7.1

3.3.7.1-1

TABLE 3.2.A-1

ISOLATION ACTUATION INSTRUMENTATION

Note 2 to Surveillance Requirements

A.2 Allowable Value

LA.2

A.1

Functional Unit	Trip Setpoint[a]	Minimum CHANNEL(s) per TRIP SYSTEM[a]	Applicable OPERATIONAL MODE(s)	ACTION
1. PRIMARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level - Low	≥144 inches	2	1, 2, 3	20
b. Drywell Pressure - High[a]	≤2.5 psig	2	1, 2, 3	20
c. Drywell Radiation - High	≤100 R/hr	1	1, 2, 3	23
2. SECONDARY CONTAINMENT ISOLATION CREV System Isolation Instrumentation				
1 a. Reactor Vessel Water Level - Low[illegible]	≥144 inches LF.1	2	1, 2, 3 & (e)	C 24
2 b. Drywell Pressure - High[illegible] LA.3 A.6	≤2.5 psig	2	1, 2, 3	C 24
5 c. Reactor Building Ventilation Exhaust Radiation - High[illegible]	≤10 mR/hr	2	1, 2, 3 & **	B 24
4 d. Refueling Floor Radiation - High[illegible]	≤100 mR/hr	2	1, 2, 3 & **	B 24
3. MAIN STEAM LINE (MSL) ISOLATION				
a. Reactor Vessel Water Level - Low Low	≥84 inches	2	1, 2, 3	21
b. MSL Tunnel Radiation - High[b]	≤15[b] x normal background	2	1, 2, 3	21
c. MSL Pressure - Low	≥825 psig	2	1	22
d. MSL Flow - High[illegible] LA.3	≤140% of rated LF.1	2/line	1, 2, 3	B 21 L.1
e. MSL Tunnel Temperature - High	≤200°F	2 of 4 in each of 2 sets	1, 2, 3	21

M.1

A.5

See ITS 3.3.6.1

See ITS 3.3.6.1

See ITS 3.3.6.1

See ITS 3.3.6.1

A.5 M

Page 4 of 9

TABLE 3.2.A-1 (Continued)

3.3.7.1

ISOLATION ACTUATION INSTRUMENTATION

<see ITS 3.3.6.1>

ACTION

ACTION 20 - Be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.

L.1

ACTION D

ACTION 21 - ~~Be in at least STARTUP~~ with the associated isolation valves closed within 8 ① hours ~~or be in at least HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the next 24 hours.~~

ACTION 22 - Be in at least STARTUP within 8 hours.

<see ITS 3.3.6.1>

ACTION 23 - Close the affected system isolation valves within one hour and declare the affected system inoperable.

ACTION D

ACTION 24 - Establish SECONDARY CONTAINMENT INTEGRITY with the standby gas treatment system operating within one hour.

add proposed Required Actions D.1 and D.3

M.1

<see ITS 3.3.6.2>

add proposed Required Actions D.1 and D.3

L.1

A.1

ITS 3.3.7.1

Table 3.3.7.1-1

TABLE 3.2.A-1 (Continued)

M.1

ISOLATION ACTUATION INSTRUMENTATION

add CORE ALTERATIONS

L.2

TABLE NOTATION

Table 3.3.7.1-1 Notes

(a) * During ~~CORE ALTERATIONS~~ or operations with a potential for draining the reactor vessel.

(b) ** When handling irradiated fuel in the secondary containment.

Insert Table 3.2.A-1 footnote (a) A.4

(a) ~~A CHANNEL may be placed in an inoperable status for up to 2 hours for required surveillance without placing the CHANNEL in the tripped condition provided the Functional Unit maintains isolation actuation capability.~~

(b) Also trips the mechancal vacuum pump and isolates the steam jet air ejectors.

(c) Isolates the reactor building ventilation system and actuates the standby gas treatment system.

A.6

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

see ITS 3.3.6.1

(e) Only one TRIP SYSTEM.

(f) Closes only reactor water cleanup system isolation valves.

(g) Only one trip system requied in OPERATIONAL MODE(s) 4 and 5 with RHR Shutdown Cooling System integrity maintained. System integrity is maintained provided the piping is intact and no maintenance is being performed that has the potential for draining the reactor vessel through the system.

(h) Normal background is as measured during full power operation without hydrogen being injected.

(i) Includes a time delay of 3 ≤ t ≤ 9 seconds.

(j) ~~Reactor vessel water level settings are expressed in inches above the top of active fuel (which is 360 inches above vessel zero).~~

LA.2

(k) ~~Also isolates the control room ventilation system.~~

LA.3

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~~TS~~ 3.3.7.1

A.4

Insert Table 3.2.A-1 footnote a

Insert 6, Page 3/4.2-7

(a) When a CHANNEL is placed in an inoperable status solely for performance of required surveillances, entry into associated Limiting Conditions for Operation and required ACTIONs may be delayed for up to 6 hours provided the Functional Unit maintains isolation actuation capability.

Note 2
to Surveillance
Requirements

Table 3.3.7.1

TABLE 4.2.A-1

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

see ITS 3.3.6.1

A.5

A.1

Function Functional Unit	SR 3.3.7.1.1 CHANNEL CHECK	SR 3.3.7.1.2 CHANNEL FUNCTIONAL TEST	SR 3.3.7.1.3 SR 3.3.7.1.4 SR 3.3.7.1.5 CHANNEL CALIBRATION	Applicable OPERATIONAL MODE(s)
1. PRIMARY CONTAINMENT ISOLATION				
a. Reactor Vessel Water Level - Low	S	M	E(a)	1, 2, 3
b. Drywell Pressure - High(b)	NA	M	Q	1, 2, 3
c. Drywell Radiation - High	S	M	E	1, 2, 3
CREV System Isolation Instrumentation **~~2. SECONDARY CONTAINMENT ISOLATION~~**		A.4	24 months LE.1	
1 a. Reactor Vessel Water Level - Low[illegible] LA.3	S-1	~~M~~ ~~Q~~-2	5 ~~E~~[illegible]-3	1, 2, 3 & *
2 b. Drywell Pressure - High[illegible] A.6	NA	~~M~~ ~~Q~~-2	Q-4	1, 2, 3
5 c. Reactor Building Ventilation Exhaust Radiation - High[illegible]	S-1	~~M~~ ~~Q~~-2	Q-4	1, 2, 3 & **
4 d. Refueling Floor Radiation - High[illegible] LA.3	S-1	~~M~~ ~~Q~~-2	Q-4	1, 2, 3 & **
3. MAIN STEAM LINE (MSL) ISOLATION				
a. Reactor Vessel Water Level - Low Low	S	M	E(a)	1, 2, 3
b. MSL Tunnel Radiation - High	S	M	E(a)	1, 2, 3
c. MSL Pressure - Low	NA	M	Q	1
3 d. MSL Flow - High(a) LA.3	S-1	A4 ~~M~~ ~~Q~~ - 2	~~E~~-5 24 months LE.1	1, 2, 3
e. MSL Tunnel Temperature - High	NA	E	E	1, 2, 3

See ITS 3.3.6.1

A.5

see ITS 3.3.6.1

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3/4.2-8

ITS 3.3.7.1

A.1

ITS 3.3.7.1

Table 3.3.7.1-1

TABLE 4.2.A-1 (Continued)

ISOLATION ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

M.2

TABLE NOTATION

L.2

add CORE ALTERATIONS

Table 3.3.7.1-1 Notes

(a) * During CORE ALTERATIONS or operations with a potential for draining the reactor vessel.

(b) ** When handling irradiated fuel in the secondary containment.

92 A.4

SR 3.3.7.1.3 (a) Trip units are calibrated at least once per 31 days and transmitters are calibrated at the frequency identified in the table.

A.6

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

(c) Isolates the reactor building ventilation system and actuates the standby gas treatment system.

<See ITS 3.3.6.1>

(d) Also isolates the control room ventilation system. LA.3

(e) These instrument channels will be calibrated using simulated electrical signals once every three months. In addition, calibration including the sensors will be performed every 18 months.

<See ITS 3.3.6.1>

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DISCUSSION OF CHANGES
ITS: 3.3.7.1 - CREV SYSTEM INSTRUMENTATION

ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 CTS 3.2.A requires the isolation actuation instrumentation setpoints to be set consistent with the Trip Setpoint values shown in Table 3.2.A-1. CTS 3.2.A Action 1 requires the CHANNEL to be declared inoperable when the setpoint is less conservative than the value shown in the Trip Setpoint column of Table 3.2.A-1. Table 3.2.A-1 includes a "Trip Setpoint" column. It is proposed to re-label this column as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1 (ISTS Table 3.3.7.1-1). In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS Table 3.2.A-1 are applied as the Operability limit for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual trip setpoints specified in CTS Table 3.2.A-1 for the isolation actuation instrumentation Functions or the Allowable Values specified in ITS Table 3.3.7.1-1 (see Discussion of Change LF.1 below for proposed changes to the Trip Setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

A.3 This proposed change to the CTS 3.2.A Actions provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3, "Completion Times," the ITS 3.3.7.1 ACTIONS Note ("Separate Condition entry is allowed for each....") and the wording for ACTION A ("One or more channels...") provide direction consistent with the intent of the existing Action for an inoperable CREV System instrumentation channel. It is intended that each inoperable channel is allowed a certain time to complete the Required Actions. Since this change only provides more explicit direction of the current interpretation of the existing specifications, this change is considered administrative.

ADMINISTRATIVE (continued)

A.4 These changes to CTS 3/4.2.A are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 27, 1999. The changes identified are consistent with the allowances in GENE-770-06-1-A, "Bases for changes to Surveillance Test intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specification, NEDC-31677-P-A, "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation," July 1980, and NEDC-30851P-A Supplement 2, "Technical Specifications Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," March 1989. As such, this change is considered administrative.

A.5 CTS Table 3.2.A-1 and Table 4.2.A-1 Functional Units 2.a, 2.b, 2.c, and 2.d provide isolation actuation instrumentation requirements for the Secondary Containment. In addition, CTS Table 3.2.A-1 and Table 4.2.A-1 Functional Unit 3.d provides isolation actuation instrumentation requirements for Main Steam Line (MSL) Isolation. As indicated in footnote (k) of Table 3.2.A-1 and footnote (d) of Table 4.2.A-1, this instrumentation also isolates the Control Room Emergency Ventilation System. The requirements for the isolation requirements of the secondary containment and the main steam isolation valves are retained in ITS 3.3.6.2 and ITS 3.3.6.1, respectively. ITS 3.3.7.1 includes only the requirements for the Control Room Emergency Ventilation System isolation instrumentation. Therefore, this change is considered administrative and is consistent with the format of NUREG-1433, Rev. 1.

A.6 CTS Table 3.2.A-1 (d) and CTS Table 4.2.A-1 Note (b) state that the Drywell Pressure—High Function (Functional Unit 1.b) is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required in MODE 2 (i.e., when Special Test Exception 3.12.A is being used). These notes are deleted from CTS Tables 3.2.A-1 and 4.2.A-1 since the only applicable condition in which these notes would be needed has been deleted (see Discussion of Changes for CTS: 3/4.12.A, in ITS Section 3.10). Therefore, Note (d) of CTS Table 3.2.A-1 and Note (b) of CTS Table 4.2.A-1 are no longer required and the change is considered administrative.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS Table 3.2.A-1 Functional Units 2.a, 2.b, 2.c, and 2.d Action 24 requires the establishment of the SECONDARY CONTAINMENT INTEGRITY with the standby gas treatment system operating within one hour. This Action does not provide the necessary actions to ensure the design bases safety analyses is met for when the CREV System isolation instrumentation is inoperable. Therefore, additional Required Actions have been added to address this specific concern. The proposed Required Actions will require the isolation of each required control room penetration flow path within 1 hour (ITS 3.3.7.1 Required Action D.1) or the declaration that the CREV System is inoperable within 1 hour (Required Action D.3). These actions will ensure adequate compensatory measures are taken to either activate the associated equipment required to function or to take actions previously approved by the NRC when the CREV System is inoperable for reasons other than isolation instrumentation. Therefore, these additional requirements are considered more restrictive on plant operations but necessary to ensure the design bases analyses are met.

M.2 The Applicability for CTS Table 3.2.A-1 and 4.2.A-1 Functional Units 2.c and 2.d have been changed to include CORE ALTERATIONS as stated in ITS Table 3.3.7.1 footnote (b). This proposed Applicability is consistent with the Applicability for the Control Room Emergency Ventilation System in CTS 3.8.D (ITS 3.7.4 and 3.7.5). This change is more restrictive but necessary to ensure the control room personnel are protected in the event of an inadvertent criticality during CORE ALTERATIONS.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The detail in CTS 3.2.A Action footnote a, relating to placing channels in trip, is proposed to be relocated to the Bases. The ACTIONS of ITS 3.3.7.1 ensure inoperable channels are placed in trip (which effectively trips the trip system) or remedial actions are taken to compensate for the inoperability, as appropriate. As a result, these relocated details are not necessary for ensuring the appropriate actions are taken in the event of inoperable CREV System isolation channels. As such, these relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

TECHNICAL CHANGES - LESS RESTRICTIVE

LA.2 The detail in CTS Table 3.2.A-1 Note (j) related to the reference setting of the reactor vessel water level instrumentation is proposed to be relocated to the UFSAR. This detail is not necessary to ensure the OPERABILITY of the CREV System isolation instrumentation. The requirements of ITS 3.3.7.1 and the Surveillances are adequate to ensure the CREV System isolation reactor vessel water level instrumentation is maintained OPERABLE. Therefore, this relocated detail is not required to be in the ITS to provide adequate protection of public health and safety. Changes to the UFSAR are controlled by the provisions of 10 CFR 50.59.

LA.3 System design and operation details specified in CTS Table 3.2.A-1 Note (k) and CTS Table 4.2.A-1 Note (d) are proposed to be relocated to the Bases. Details relating to system design and operation (i.e., specific equipment actuated) are unnecessary in the LCO. These details are not necessary to ensure the Operability of the CREV System Isolation Instrumentation. The requirements of ITS 3.3.7.1 and the associated Surveillance Requirements are adequate to ensure the CREV System Isolation instruments are maintained Operable. Therefore, the relocated details are not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LD.1 The Frequency for performing the LOGIC SYSTEM FUNCTIONAL TEST portion of CTS 4.2.A.2 (proposed SR 3.3.7.1.6) has been extended from 18 months to 24 months. This SR ensures that CREV System Isolation Instrumentation logic will function as designed to ensure proper response during an analyzed event. The proposed change will allow this Surveillance to extend its Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that these tests normally pass their Surveillances at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. The CREV System

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd) including the actuating logic is designed to be single failure proof, and therefore, is highly reliable. In addition, major deviations in the instrumentation during the operating cycle will be detected since other surveillances are performed such as the CHANNEL CHECK and CHANNEL FUNCTIONAL TEST (proposed SRs 3.3.7.1.1 and 3.3.7.1.2) at a more frequent basis. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24-month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LE.1 The Frequency for performing the CHANNEL CALIBRATION of CTS 4.2.A.1 as specified in Table 4.2.A-1 (proposed SR 3.3.7.1.5) has been extended from 18 months to 24 months. The subject SR ensures that the CREV System Isolation Instrumentation will function as designed during an analyzed event. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Extending the SR Frequency is acceptable because the isolation initiation logic is designed to be single failure proof, and therefore, is highly reliable. Furthermore, the impacted isolation instrumentation has been evaluated based on make, manufacturer, and model number to determine that the instrumentation's actual drift falls within the design allowance in the associated setpoint calculation. The following paragraph, listed by CTS Instrumentation number, identify by make, manufacturer and model number the drift evaluations performed:

Functional Unit 2.a: Reactor Vessel Water Level—Low

This function is performed by Rosemount 1153DB4PA Transmitters and 510DU/710DU Trip Units. The Rosemount Trip Units are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Rosemount Trip Units with respect to drift. The Rosemount Transmitters' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 3.d: Main Steam Line Flow—High

This function is performed by Barton 278 differential pressure indicating switches for Unit 1 and Barton 288A differential pressure indicating switches for Unit 2. Both types of Barton differential pressure indicating switches are functionally checked and setpoint verified more frequently, and if necessary, recalibrated. These more frequent testing requirements remain unchanged. Therefore, an increase in the surveillance interval to accommodate a 24 month fuel cycle does not affect the Barton differential pressure indicating switches with respect to drift. The switches' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Based on the design of the instrumentation and the drift evaluations, it is concluded that the impact, if any, on system availability is minimal as a result of the change in the surveillance test interval.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) A review of the surveillance test history was performed to validate the above conclusion. This review of the surveillance test history demonstrates that there are no failures that would invalidate the conclusion that the impact, if any, on system availability is minimal from a change to a 24-month surveillance frequency. In addition, the proposed 24-month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

L.1 CTS Table 3.2.A-1 Action 21 requires the plant to be in at least STARTUP with the associated isolation valves closed within 8 hours or be in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the next 24 hours if the CTS 3.2.A Actions are not met for CTS Table 3.2.A-1 Functional Unit 3.d (MSL Flow—High). In the ITS, the requirement to isolate the associated Main Steam Lines has been retained in ITS 3.3.7.1 Required Action D.2, however two additional options have been added in lieu of requiring the unit to be in startup or to be fully shutdown, and the Completion Time to isolate the associated main steam line(s) has been reduced from 8 hours to 1 hour. Proposed ITS 3.3.7.1 Required Actions D.1 and D.3 require either the isolation of each required control room penetration flow path within 1 hour or to declare the CREV System inoperable within 1 hour, respectively, when a channel is not tripped within 24 hours. The deletion of the requirement to shut down the unit in CTS Table 3.2.A-1 Action 21 has been deleted since the alternative actions provided in ITS will activate the associated CREV System that is required to function, consistent with the actions of the CREV System instrumentation if the CREV System instrumentation logic were in the trip condition. Alternately, it is acceptable to declare the associated CREV System inoperable since the associated CREV System Specification (ITS 3.7.4) will provide appropriate actions that are identical to actions taken when the CREV System is inoperable for reasons other than inoperable instrumentation. The current requirements are overly restrictive, in that if the associated CREV System was inoperable for other reasons, a much longer restoration time is provided. Therefore, this change is considered acceptable.

TECHNICAL CHANGES - LESS RESTRICTIVE (continued)

L.2 CTS Tables 3.2.A-1 and 4.2.A-1 Functional Unit 2.a, Reactor Vessel Water Level—Low, is required to be Operable during CORE ALTERATIONS and operations with a potential for draining the reactor vessel as stated in Note * of the Tables. The automatic CREV System isolation capability on reactor vessel water level decreases is not necessary during CORE ALTERATIONS. CORE ALTERATIONS do no result in any increased potential for vessel drain down. If ongoing activities do involve a potential for draining the reactor vessel, the Applicability of ITS Table 3.3.7.1-1 Function 1 will still require the Reactor Vessel Water Level—Low Function to be Operable. Therefore, the ITS will not include the Applicability of CORE ALTERATIONS for this Function.

RELOCATED SPECIFICATIONS

None

A.1

A.2

ITS 3.3.7.2

3.2 - LIMITING CONDITIONS FOR OPERATION

L. Mechanical Vacuum Pump Isolation Instrumentation

LCO 3.3.7.2 Four CHANNELS of the of the Main Steam Line Radiation - High Function for the Mechanical Vacuum Pump trip shall be OPERABLE(c).

APPLICABILITY

OPERATIONAL MODE(s) 1 and 2 with the Mechanical Vacuum Pump in service and any main steam line not isolated.

ACTION: add proposed ACTIONS Note A.3

With one or more CHANNEL(s) inoperable:

ACTION B a. Within one hour, verify sufficient CHANNELS remain OPERABLE to maintain trip capability, AND

ACTION A b. Within 12 hours, place the inoperable CHANNEL(s) in the tripped condition(d). add proposed Required Action A.1 A.4

Otherwise, within 12 hours either:

ACTION C
a. Trip or isolate the Mechanical Vacuum Pump, OR

b. Close the Main Steam Lines, OR

c. Be in OPERATIONAL MODE 3.

4.2 - SURVEILLANCE REQUIREMENTS

L. Mechanical Vacuum Pump Isolation Instrumentation

The Main Steam Line Radiation - High Function for the Mechanical Vacuum Pump trip shall be demonstrated OPERABLE by performance of a:

A.6

SR 3.3.7.2.1 1. CHANNEL CHECK at least once per 12 hours,

92 A.5

SR 3.3.7.2.2 2. CHANNEL FUNCTIONAL TEST at least once per 31 days, and

SR 3.3.7.2.4 3. CHANNEL CALIBRATION(a) at least once per 18 months. The ~~trip setpoint~~ shall be ≤ 15 x normal background(b).

24 LE.1 Allowable Value LF.1

SR 3.3.7.2.5 4. LOGIC SYSTEM FUNCTIONAL TEST at least once per 18 months including the Mechanical Vacuum Pump breaker.

24 LD.1

SR 3.3.7.2.3

SR 3.3.7.2.4

(a) A current source provides an instrument channel alignment every 3 months.

(b) Normal background is as measured during full power operation without hydrogen being injected.

(c) When a CHANNEL is placed in an inoperable status solely for performance of required surveillances, entry into the associated Limiting Conditions for Operation and required ACTIONs may be delayed for up to 6 hours provided Mechanical Vacuum Pump trip capability is maintained.

(d) Not applicable if the inoperable channel is due to an inoperable Mechanical Vacuum Pump breaker.

Required Action A.2 Note

Note to Surveillance Requirements

Page 1 of 1

DISCUSSION OF CHANGES
ITS: 3.3.7.2 - MECHANICAL VACUUM PUMP TRIP INSTRUMENTATION

ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 These changes to CTS 3/4.2.A are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 30, 1999. The changes identified are consistent with the allowances in NEDO-31400A to remove the main steam isolation is a result of a main steam line high radiation signal. As such, these changes are administrative.

A.3 This proposed change to the CTS 3.2.L Actions provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3, "Completion Times," the ITS 3.3.7.2 ACTIONS Note ("Separate Condition entry is allowed for each....") and the wording for ACTION A ("One or more channels...") provides direction consistent with the intent of the existing Actions for an inoperable trip instrumentation channel. It is intended that each inoperable channel is allowed a certain time to complete the Required Actions. Since this change only provides more explicit direction of the current interpretation of the existing specifications, this change is considered administrative.

A.4 An action to "restore channel to OPERABLE status" has been added to the CTS 3.2.L Actions (ITS 3.3.7.2 Required Action A.1). Since this option always exists, this change is considered administrative.

A.5 CTS 4.2.L requires the mechanical vacuum pump trip instrumentation setpoint to be set consistent with the Trip Setpoint value specified in CTS 4.2.L. The CHANNEL would be declared inoperable when the setpoint is less conservative than the value shown in CTS 4.2.L.3. CTS 4.2.L.3 includes a "Trip Setpoint" It is proposed to re-label this as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1. In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS 4.2.L.3 are applied as the Operability limit for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual trip

ADMINISTRATIVE

A.5 (cont'd) setpoint specified in CTS 4.2.L for the mechanical vacuum pump trip instrumentation Functions or the Allowable Value specified in ITS SR 3.3.7.2.4 (see Discussion of Change LF.1 below for proposed changes to the Trip Setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

A.6 These changes to CTS 3/4.2.A are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 27, 1999. The changes identified are consistent with the allowances in NEDC-31677-P-A, "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation," July 1980, and NEDC-30851P-A Supplement 2, "Technical Specifications Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," March 1989. As such, these changes are administrative.

TECHNICAL CHANGES - MORE RESTRICTIVE

None

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LD.1 The Frequency for performing the LOGIC SYSTEM FUNCTIONAL TEST (LSFT) of CTS 4.2.L.4 (proposed SR 3.3.7.2.5) has been extended from 18 months to 24 months. This SR ensures that Trip Instrumentation logic will function as designed to ensure proper response during an analyzed event. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24-month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that these tests normally pass their surveillances at the current frequency. An evaluation has been performed using this data and it has been

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd) determined that the effect on safety due to the extended Surveillance Frequency will be minimal. The instrument channels are tested on a more frequent basis during the operating cycle in accordance with CTS 4.2.L.2, the CFT. This testing of the instrumentation ensures that a significant portion of the trip instrumentation circuitry is operating properly and will detect significant failures of this circuitry. The trip logic is designed to be single failure proof and therefore, is highly reliable. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LE.1 The Frequency for performing the CHANNEL CALIBRATION Surveillance of current Surveillance 4.2.L.3 (proposed SR 3.3.7.2.4) has been extended from 18 months to 24 months. The proposed change will allow this Surveillance to extend the Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). The subject SR ensures that the Trip instruments will function as designed during an

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) analyzed event. Extending the SR Frequency is acceptable because the initiation logic is designed to be single failure proof and, therefore, is highly reliable. Furthermore, the impacted Trip instrumentation has been evaluated based on make, manufacturer and model number to determine that the instrumentation's actual drift falls within the design allowance in the associated setpoint calculation.

This function is performed by a General Atomic RD-23 Radiation Detector, General Atomic RP-2CM Radiation Monitor. This instrument was evaluated utilizing a qualitative analysis (i.e., engineering judgment). The results of the analysis support a 24 month fuel cycle surveillance interval extension.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

None

RELOCATED SPECIFICATIONS

None

LOP Instrumentation A.2

A.1

3.2 - LIMITING CONDITIONS FOR OPERATION

B. ~~Emergency Core Cooling Systems (ECCS) Actuation~~ LOP A.2 Loss of Power (LOP) Instrumentation

LCO 3.3.8.1

The ~~ECCS actuation~~ instrumentation CHANNEL(s) shown in Table 3.2.B-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the ~~Trip Setpoint~~ column.

Allowable Value

Allowable Values

A.3

APPLICABILITY:

As shown in Table 3.2.B-1.

Add proposed ACTIONS Note A.4

ACTION:

ACTION A

1. With an ~~ECCS actuation~~ LOP A.2 instrumentation CHANNEL trip setpoint less conservative than the value shown in the ~~Trip Setpoint~~ column of Table 3.2.B-1, declare the CHANNEL inoperable until the CHANNEL is restored to OPERABLE status with its trip setpoint adjusted consistent with the ~~Trip Setpoint~~ value.

   Allowable Value A.3

2. With one or more ~~ECCS actuation~~ LOP A.2 instrumentation CHANNEL(s) inoperable, take the ACTION required by Table 3.2.B-1.

3. ~~With either ADS TRIP SYSTEM inoperable, restore the inoperable TRIP SYSTEM to OPERABLE status within:~~

   a. ~~7 days provided that both the HPCI and RCIC systems are OPERABLE, or~~

   b. ~~72 hours.~~

   ~~With the above provisions of this ACTION not met, be in at least HOT~~

A.6

4.2 - SURVEILLANCE REQUIREMENTS

A.2

B. ~~ECCS Actuation~~ LOP Instrumentation

Note 1 to Surveillance Requirements

1. Each ~~ECCS actuation~~ LOP Instrumentation instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the ~~CHANNEL CHECK,~~ CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL MODE(s) and at the frequencies shown in Table 4.2.B-1.

   See ITS 3.3.5.1

SR 3.3.8.1.3

2. LOGIC SYSTEM FUNCTIONAL TEST(s) of all CHANNEL(s) shall be performed at least once per ~~18~~ 24 months. LD.1

A.2 — LOP → ECCS ACTUATION

Table 3.3.8.1-1

TABLE 3.2.B-1 (Continued)

ECCS ACTUATION INSTRUMENTATION

see ITS 3.3.5.1

Function Functional Unit	Trip Setpoint[h]	Minimum CHANNEL(s) per Trip Function[d]	Applicable OPERATIONAL MODE(s)	ACTION
5. AUTOMATIC DEPRESSURIZATION SYSTEM - TRIP SYSTEM 'B' [d]				
a. Reactor Vessel Water Level - Low Low	≥84 inches	2	1, 2, 3	30
b. Drywell Pressure - High[m]	<2.5 psig	2	1, 2, 3	30
c. Initiation Timer	≤120 sec	1	1, 2, 3	31
d. Low Low Level Timer	≤9.0 min	1	1, 2, 3	31
e. CS Pump Discharge Pressure - High (Permissive)	≥100 psig & ≤150 psig	1/pump	1, 2, 3	31
f. LPCI Pump Discharge Pressure - High (Permissive)	≥100 psig & ≤150 psig	1/pump	1, 2, 3	31

A.1

A.3 — Allowable Value → ~~Trip Setpoint~~

	Allowable Value ~~Trip Setpoint~~	Minimum CHANNEL(s) per Trip Function	Applicable OPERATIONAL MODE(s)	ACTION
6. LOSS OF POWER				
1. a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	3045 ± 152 volts decreasing voltage	2/bus	1, 2, 3, 4[d], 5[d]	36
2.a 2.b b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	≥3845 volts (Unit 1) ≥3845 volts (Unit 2) and ≤ 3933 volts	2/bus	1, 2, 3, 4[d], 5[d]	36

LF.1

LA.1

ACTIONS A and B

LF.1

2.a

2.b

M.1

M.2

ECCS Actuation

LOP Instrumentation

A.2

ITS 3.3.8.1

Page 2 of 6

ITS 3.3.8.1

A.1

~~ECCS Actuation~~ LOP Instrumentation 3/4.2.B A.2

Table 3.3.8.1-1

TABLE 3.2.B-1 (Continued)

A.2 LOP ~~ECCS ACTUATION~~ **INSTRUMENTATION**

<See ITS 3.3.5.1>

ACTION

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

a. With one CHANNEL inoperable, place the inoperable CHANNEL in the tripped condition within one hour or declare the associated ECCS system(s) inoperable.

b. With more than one CHANNEL inoperable, declare the associated ECCS system(s) inoperable.

ACTION 31 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement:

a. For ADS, declare the associated ADS TRIP SYSTEM inoperable.

b. For CS, LPCI or HPCI, declare the associated ECCS system(s) inoperable.

ACTION 32 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, place the inoperable CHANNEL in the tripped condition within one hour.

ACTION 33 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, place the inoperable CHANNEL in the tripped condition within one hour; restore the inoperable CHANNEL to OPERABLE status within 7 days or declare the associated ECCS system(s) inoperable.

ACTION 34 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, restore the inoperable CHANNEL to OPERABLE status within 8 hours or declare the associated ECCS system(s) inoperable.

ACTION 35 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, place at least one inoperable CHANNEL in the tripped condition within one hour or declare the HPCI system inoperable.

ACTION 36 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) per Trip Function requirement, place the inoperable CHANNEL in the tripped condition within one hour, or declare the associated emergency diesel generator inoperable ~~and take the ACTION required by Specification 3.9.A or 3.9.B, as appropriate.~~ A.5

ACTION A

ACTION B

Page 3 of 6

A.1

LOP Instrumentation A.2

Table 3.3.8.1-1

TABLE 3.2.B-1 (Continued)

LOP ~~ECCS ACTUATION~~ INSTRUMENTATION

A.2

TABLE NOTATION

(a) A CHANNEL may be placed in an inoperable status for up to 2 hours for required surveillance without placing the CHANNEL in the tripped condition provided the associated Functional Unit maintains ECCS initiation capability.

(b) Also actuates the associated emergency diesel generator.

(c) When the system is required to be OPERABLE per Specification 3.5.B.

(d) Not required to be OPERABLE when reactor steam dome pressure is ≤150 psig.

See ITS 3.3.5.1

Applicability (e) Required when the associated diesel generator is required to be OPERABLE per Specification 3.9.B.

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

Function 2.b (g) With no LOCA signal present, there is an additional time delay of 5 ± 0.25 minutes. LF.1

(h) Reactor water level settings are expressed in inches above the top of active fuel (which is 360 inches above vessel zero).

(i) Provides signal to pump suction valves only.

See ITS 3.3.5.1

Function 2.a (j) There is an inherent time delay of 7 ± 1.4 seconds on degraded voltage. LF.1

QUAD CITIES - UNITS 1 & 2

Table 3.3.8.1-1

TABLE 4.2.B-1 (Continued)

A.2 LOP

~~ECCS ACTUATION~~ INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<See ITS 3.3.5.1>

INSTRUMENTATION

Function Functional Unit	CHANNEL CHECK	SR 3.3.8.1.1 CHANNEL FUNCTIONAL TEST	SR 3.3.8.1.2 CHANNEL CALIBRATION	Applicable OPERATIONAL MODE(s)
4. AUTOMATIC DEPRESSURIZATION SYSTEM(d)				
a. Reactor Vessel Water Level - Low Low	S	M	Q	1, 2, 3
b. Drywell Pressure - High(d)	NA	M	Q	1, 2, 3
c. Initiation Timer	NA	E	E	1, 2, 3
d. Low Low Level Timer	NA	E	E	1, 2, 3
e. CS Pump Discharge Pressure - High (Permissive)	NA	M	Q	1, 2, 3
f. LPCI Pump Discharge Pressure - High (Permissive)	NA	M	Q	1, 2, 3
5. LOSS OF POWER				
1 a. 4.16 kv Emergency Bus Undervoltage (Loss of Voltage)	NA	~~E~~ 24 months	~~E~~	1, 2, 3, ~~4(d), 5(d)~~
2.a 2.b b. 4.16 kv Emergency Bus Undervoltage (Degraded Voltage)	NA	~~E~~	~~E~~	1, 2, 3, ~~4(d), 5(d)~~

<See ITS 3.3.5.1>

A.1

24 months LE.1

LD.1

M.1

3/4.2-19

Amendment Nos. 171 & 167

A.2 LOP Instrumentation ~~ECCS Actuation~~ 3/4.2.B

ITS 3.3.8.1

Page 5 of 6

A.1

LOP Instrumentation

A.2

Table 3.3.8.1-1

TABLE 4.2.B-1 (Continued)

LOP

~~ECCS ACTUATION~~ INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATION

(a) Not required to be OPERABLE when reactor steam dome pressure is ≤150 psig.

(b) When the system is required to be OPERABLE per Specification 3.5.B.

See ITS 3.3.5.1

Applicability (c) Required when the associated diesel generator is required to be OPERABLE per Specification 3.9.B.

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

(e) Trip units are calibrated at least once per 31 days and transmitters are calibrated at the frequency identified in the table.

add proposed Note 2 to Surveillance Requirements

L.1

Page 6 of 6

ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 A new LCO, ITS 3.3.8.1, has been written specifically for the Loss of Power (LOP) Instrumentation. The LOP Function from the current ECCS instrumentation Specification (CTS 3/4.2.B) is incorporated into this LCO. ITS 3.3.8.1 requires the instruments listed in ITS Table 3.3.8.1-1 to be OPERABLE, and the Table has the appropriate Functions from CTS Tables 3.2.B-1 and 4.2.B-1 listed. Since this is an organizational change, it is considered to be administrative.

A.3 CTS 3.2.B requires the LOP instrumentation setpoints to be set consistent with the Trip Setpoint values shown in Table 3.2.B-1. CTS 3.2.B Action 1 requires the CHANNEL to be declared inoperable when the setpoint is less conservative than the value shown in the Trip Setpoint column of Table 3.2.B-1. Table 3.2.B-1 includes a "Trip Setpoint" column. It is proposed to re-label this column as "Allowable Value" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1 (ISTS Table 3.3.8.1-1). In accordance with current plant procedures and practices, the Trip Setpoints specified in CTS Table 3.2.B-1 are applied as the Operability limit for the associated instruments. Therefore, the use of the term "Trip Setpoint" in the CTS is the same as the use of the term "Allowable Value" in the ITS. This proposed change does not modify the actual trip setpoints specified in CTS Table 3.2.B-1 for the LOP instrumentation Functions or the Allowable Values specified in ITS Table 3.3.8.1-1 (see Discussion of Change LF.1 below for proposed changes to the Trip Setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

A.4 This proposed change to the CTS 3.2.B Actions provides more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3 - "Completion Times," the ITS 3.3.8.1 ACTIONS Note ("Separate Condition entry is allowed for each....") provides direction consistent with the intent of the existing Action for an inoperable LOP instrumentation channel. It is intended that each

ADMINISTRATIVE

A.4 (cont'd) inoperable channel is allowed a certain time to complete the Required Actions. Since this change only provides more explicit direction of the current interpretation of the existing specifications, this change is considered administrative.

A.5 CTS Table 3.2.B-1 ACTION 36 requires the DG to be declared inoperable and to take the ACTION required by Specification 3.9.A or 3.9.B, as appropriate, when the inoperable LOP instrumentation channel is not tripped within 1 hour. The format of the ITS does not include providing "cross references." ITS 3.8.1 and ITS 3.8.2 adequately prescribe the Required Actions for an inoperable DG without such references. Therefore, the existing reference in CTS Table 3.2.B-1 ACTION 36 to "take the ACTION required by Specification 3.9.A or 3.9.B" serves no functional purpose, and its removal is purely an administrative difference in presentation.

A.6 These changes to CTS 3/4.2.B are provided in the Quad Cities ITS consistent with the Technical Specifications Change Request submitted to the NRC for approval per ComEd letter dated December 27, 1999. The changes identified are consistent with the allowances in NEDC-30936P-A, Part 1 and Part 2, "Technical Specification Improvement Methodology With Demonstration for BWR ECCS Actuation Instrumentation," December 1988. As such, these changes are considered to be administrative.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 CTS Tables 3.2.B-1 and 4.2.B-1 require the LOP instruments to be OPERABLE during MODES 4 and 5 only when the associated DG is required to be OPERABLE (as stated in footnote (e) to Table 3.2.B-1 and footnote (c) to Table 4.2.B-1). The Applicability is being changed to be when the associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources — Shutdown," which in ITS 3.3.8.1 requires the LOP instrumentation to be OPERABLE not only during MODES 4 and 5, but also during movement of irradiated fuel assemblies in the secondary containment (which could be when the unit is defueled). This will ensure the DGs can be properly actuated at all times when they are required to be OPERABLE and is an additional restriction on plant operation.

M.2 A new Allowable Value has been added for the LOP Function. The maximum Allowable Value has been added for CTS Table 3.2.B-1 Degraded Voltage Function (ITS Table 3.3.8.1-1 Function 2.a) to prevent inadvertent power supply transfer. The new maximum Allowable Value represents an additional restriction on plant operation.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LA.1 The detail in CTS Table 3.2.B-1 Functional Unit 6.a relating to the methods (on decreasing voltage) for determining the 4160 V ESS Bus Undervoltage (Loss of Voltage) Setpoint is proposed to be relocated to the Bases. This detail is not necessary to ensure the OPERABILITY of the loss of power instrumentation. The requirements of ITS 3.3.8.1 and proposed SR 3.3.8.1.2 are adequate to ensure the loss of power instruments are maintained OPERABLE. Therefore, the relocated detail is not required to be in the ITS to provide adequate protection of the public health and safety. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program described in Chapter 5 of the ITS.

LD.1 The Frequency for performing the LOGIC SYSTEM FUNCTIONAL TEST of CTS 4.2.B.2 and the CHANNEL FUNCTIONAL TEST of CTS Table 4.2.B-1 have been extended from 18 months to 24 months in proposed SR 3.3.8.1.1 and SR 3.3.8.1.3. These SRs ensure that LOP Instrumentation logic will function as designed to ensure proper response during an analyzed event. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that these tests normally pass their Surveillances at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. The LOP instrumentation including the actuating logic is designed to be single failure proof and therefore, is highly reliable. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd)

logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the inherent system and component reliability, the impact, if any, on system availability is minimal as a result of the change in the surveillance test interval. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LE.1 The Frequency for performing the CHANNEL CALIBRATION of CTS 4.2.B.1 (Functional Units 5.a and 5.b) has been extended from 18 months to 24 months in proposed SR 3.3.8.1.2. This SR ensures that LOP Instrumentation will function as designed to ensure proper response during an analyzed event. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991.

Extending the SR Frequency is acceptable because the electrical power sources are designed to be single failure proof and therefore are highly reliable. Major deviations in the circuitry will be discovered during the cycle since the CHANNEL FUNCTIONAL TEST of both the loss of voltage instrumentation and the time delay relays are performed more frequently. Furthermore, the impacted LOP instrumentation has been evaluated based on make, manufacturer and model number to determine that the instrumentation's actual drift falls within the design allowance in the associated setpoint calculation. The following paragraphs, listed by CTS Functional Unit number, identify by make, manufacturer and model number the drift evaluations performed:

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) **Functional Unit 5.a:** 4.16 kV Emergency Bus Undervoltage—Loss of Voltage

This function is performed by General Electric Type 12IAV69A1A relays. The GE relays' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 5.b with Note (j) time delay: 4.16 kV Emergency Bus Undervoltage—Degraded Voltage/Time Delay

This function is performed by ABB411T4375 relays, which include an integral time delay that is adjustable from 1 to 10 seconds. The ABB relays' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Functional Unit 5.b with Note (g) time delay: 4.16 kV Emergency Bus Undervoltage—Degraded Voltage Time Delay

This function is performed by Agastat ETR14D3N relays. The Agastat relays' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Based on the design of the instrumentation and the drift evaluations, it is concluded that the impact, if any, on system availability is minimal as a result of the change in the surveillance test interval.

A review of the surveillance test history was performed to validate the above conclusion. This review of the surveillance test history, demonstrates that there are no failures that would invalidate the conclusion that the impact, if any on

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) system availability is minimal from a change to a 24-month surveillance frequency. In addition, the proposed 24-month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

L.1 This change proposes to add a Note (ITS 3.3.8.1 Surveillance Requirements Note 2) to the Surveillance Requirements that will allow a 2 hour delay from entering into the associated Conditions and Required Actions for a channel placed in an inoperable status solely for performance of required Surveillances provided the associated Function maintains initiation capability for one DG and associated 4160 V ESS bus. The loss of function is acceptable in this case since only one of the two DGs are required to start within the required time and only one of the two 4160 V ESS buses are required to be energized to meet accident analysis assumptions. The short period of time (2 hours) in this condition will have no appreciable impact on risk. Also, upon completion of the Surveillance, or expiration of the 2 hour allowance, the channel must be returned to OPERABLE status or the applicable Condition must be entered and Required Actions taken.

RELOCATED SPECIFICATIONS

None

3.9 - LIMITING CONDITIONS FOR OPERATION

G. RPS Electric Power Monitoring

LCO 3.3.8.2 Two Reactor Protection System (RPS) electric power monitoring ~~CHANNEL(s)~~ assemblies for each inservice RPS Motor Generator (MG) set or alternate power supply shall be OPERABLE.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2, ~~3, 4~~[a] and 5~~[a]~~. L.1 L.3

ACTION:

ACTION A 1. With one RPS electric power monitoring ~~CHANNEL~~ assembly for an inservice RPS MG set or alternate power supply inoperable, ~~restore the inoperable power monitoring CHANNEL to OPERABLE status within 72 hours or~~ remove the associated RPS MG set or alternate power supply from service. A.2

ACTION B 2. With both RPS electric power monitoring ~~CHANNEL(s)~~ assemblies for an inservice RPS MG set or alternate power supply inoperable, ~~restore at least one electric power monitoring CHANNEL to OPERABLE status~~ within ~~30 minutes~~ 1 hour ~~or~~ remove the associated RPS MG set or alternate power supply from service. A.2 L.2

← Add proposed ACTION C — A.3

← Add proposed ACTION D — L.4

4.9 - SURVEILLANCE REQUIREMENTS

G. RPS Electric Power Monitoring

The specified RPS electric power monitoring ~~CHANNEL(s)~~ assemblies shall be determined OPERABLE:

SR 3.3.8.2.1 1. By performance of a CHANNEL FUNCTIONAL TEST[b] each time the plant is in COLD SHUTDOWN for a period of more than 24 hours, unless performed in the previous 6 months.

SR 3.3.8.2.2 SR 3.3.8.2.3 2. At least once per ~~18~~ 24 months by demonstrating the OPERABILITY of overvoltage, undervoltage, and underfrequency protective instrumentation by performance of a CHANNEL CALIBRATION including simulated automatic actuation of the protective relays, tripping logic, and output circuit breakers, and verifying the following ~~setpoints~~ Allowable Values: LD.1 LE.1 A.4

SR 3.3.8.2.2 SR 3.3.8.2.3

SR 3.3.8.2.2

a. Overvoltage ≤ 129.6 volts AC

b. Undervoltage ≥ 105.3 volts AC

c. Underfrequency ≥ 55.4 Hz

LF.1

with time delay set to ≤ [4] seconds M.2

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a With any control rod withdrawn from a core cell containing one or more fuel assemblies L.3

b Only required to be performed prior to entering MODE 2 ~~or 3~~ from MODE 3 or 4. L.1

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ADMINISTRATIVE

A.1 In the conversion of the Quad Cities 1 and 2 current Technical Specifications (CTS) to the proposed plant specific Improved Technical Specifications (ITS), certain wording preferences or conventions are adopted that do not result in technical changes (either actual or interpretational). Editorial changes, reformatting, and revised numbering are adopted to make the ITS consistent with the BWR Standard Technical Specifications, NUREG-1433, Rev. 1 (i.e., the Improved Standard Technical Specifications (ISTS)).

A.2 CTS 3.9.G Actions 1 and 2 provide the option of either restoring the inoperable RPS electric power monitoring CHANNEL(s) (assembly(s)) to OPERABLE status or removing the associated RPS power supply from service. ITS 3.3.8.2 Required Actions A.1 and B.1 require the associated inservice power supply(s) to be removed from service. The option of restoring the inoperable RPS electric power monitoring assemblies to an OPERABLE condition is implicit in the ITS. ISTS LCO 3.0.2 (proposed ITS LCO 3.0.2) states that if the LCO is met prior to expiration of the specified Completion time(s), completion of the Required Actions is not required, unless otherwise stated. As a result, it is acceptable to restore the RPS electric power monitoring assembly(s) to an OPERABLE status within the Required Action Completion Times and the Required Action of removing the associated inservice power supply(s) from service would not be required. Therefore, this proposed change, in effect, only removes a restatement of provisions specified in ITS LCO 3.0.2, and the change is consistent with the BWR ISTS, NUREG-1433, Revision 1. As such, this proposed change is considered to be administrative.

A.3 A new ACTION is provided (ITS 3.3.8.2 ACTION C) that requires a shutdown if the Required Actions of Condition A or B are not met when the unit is in MODE 1 or 2. This action is functionally equivalent to CTS 3.0.C (although CTS 3.0.C does provide an additional 1 hour to commence the shutdown). Therefore, this change is considered to be a presentation preference and is administrative.

A.4 CTS 4.9.G.2 requires verification of the RPS electric power monitoring assembly setpoints. It is proposed to re-label these "setpoints" as "Allowable Values" consistent with the format of the BWR ISTS, NUREG-1433, Rev. 1 (ISTS SR 3.3.8.2.2). In accordance with current plant procedures and practices, the setpoints specified in CTS 4.9.G.2 are applied as the Operability limits for the associated RPS electric power monitoring assemblies. Therefore, the use of the term "setpoint" in the CTS is the same as the use of the term "Allowable

ADMINISTRATIVE

A.4 (cont'd) Value" in the ITS. This proposed change does not modify the actual setpoints specified in CTS 4.9.G.2 for the RPS electric power monitoring assemblies or the Allowable Values specified in ITS SR 3.3.8.2.2 (see Discussion of Change LF.1 below for proposed changes to the setpoints/Allowable Values). Therefore, this change is considered a presentation preference change only and, as such, is considered an administrative change.

TECHNICAL CHANGES - MORE RESTRICTIVE

M.1 Not used.

M.2 Time delay setting requirements have been added in proposed SR 3.3.8.2.2 for the overvoltage, undervoltage, and underfrequency protective devices of the RPS electric power monitoring assemblies. Currently, no maximum time delay setting is provided in CTS 4.9.G.2. These devices have adjustable time delay settings. The new Allowable Value for all protective devices is ≤ 4 seconds. The Allowable Values are based on the current setpoint methodology and ensures that the devices trip to protect the equipment powered by the associated RPS motor generator or alternate power supply. This change is an additional restriction on plant operation.

TECHNICAL CHANGES - LESS RESTRICTIVE

"Generic"

LD.1 The Frequency for performing the system functional test of CTS 4.9.G.2 has been extended from 18 months to 24 months in proposed SR 3.3.8.2.3. This SR ensures that RPS electric power monitoring assemblies will function as designed to ensure proper response during an analyzed event. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification

TECHNICAL CHANGES - LESS RESTRICTIVE

LD.1 (cont'd) Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Reviews of historical maintenance and surveillance data have shown that the RPS electric power monitoring assemblies normally pass their Surveillances at the current Frequency. An evaluation has been performed using this data, and it has been determined that the effect on safety due to the extended Surveillance Frequency will be minimal. RPS electric power monitoring assemblies are normally tested on a more frequent basis during the operating cycle in accordance with CTS 4.9.G.1 (proposed SR 3.3.8.2.1). This testing of the RPS electric power monitoring assemblies, if performed, ensures that a significant portion of the RPS electric power monitoring channel circuitry is operating properly and will detect significant failures of this circuitry. If this testing is not performed, this change is still considered acceptable based on the historical data, and since the RPS electric power monitoring instrumentation is designed to be single failure proof, and therefore, is highly reliable. Furthermore, as stated in the NRC Safety Evaluation Report (dated August 2, 1993) relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic system, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the logic system functional test interval represents no significant change in the overall safety system unavailability."

Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is minimal. The review of historical surveillance data also demonstrated that there are no failures that would invalidate this conclusion. In addition, the proposed 24 month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR (30 months) do not invalidate any assumptions in the past licensing basis.

LE.1 The Frequency for performing the CHANNEL CALIBRATION requirement of CTS 4.9.G.2 has been extended from 18 months to 24 months in proposed SR 3.3.8.2.2. The subject SR ensures that the RPS electric power monitoring

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd) assemblies will trip at the specified Allowable Values. The proposed change will allow these Surveillances to extend their Surveillance Frequency from the current 18 month Surveillance Frequency (i.e., a maximum of 22.5 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2) to a 24 month Surveillance Frequency (i.e., a maximum of 30 months accounting for the allowable grace period specified in CTS 4.0.B and proposed SR 3.0.2). This proposed change was evaluated in accordance with the guidance provided in NRC Generic Letter No. 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. Extending the SR Frequency is acceptable because the RPS electric power monitoring assemblies are designed to be highly reliable. Furthermore, the impacted RPS electric power monitoring instrumentation has been evaluated based on make, manufacturer and model number as compared to similar operating equipment with similar operating characteristics to determine the instrumentation's projected drift values. The following paragraphs, listed by CTS function number, identify by make, manufacturer and model number and drift evaluations performed:

1. Overvoltage

   This function is performed by GE Electrical Protection Assembly (EPA) Model No. 914E175G001-G004 with Logic Card 148C6118G002. The EPAs' and associated Logic Cards' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

2. Undervoltage

   This function is performed by GE EPA Model No. 914E175G001-G004 with Logic Card 148C6118G002. The EPAs' and associated Logic Cards' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

TECHNICAL CHANGES - LESS RESTRICTIVE

LE.1 (cont'd)

3. Underfrequency

   This function is performed by GE EPA Model No. 914E175G001-G004 with Logic Card 148C6118G002. The EPAs' and associated Logic Cards' drift was determined by quantitative analysis. The drift value determined will be used in the development of, confirmation of, or revision to the current plant setpoint and the Technical Specification Allowable Value. The results of this analysis will support a 24 month surveillance interval or the interval will be adjusted to a value supported by the analysis.

Based on the design of the instrumentation and the drift evaluations, it is concluded that the impact, if any, on system availability is minimal as a result of the change in the surveillance test interval.

A review of the surveillance test history was performed to validate the above conclusion. This review of the surveillance test history, demonstrates that there are no failures that would invalidate the conclusion that the impact, if any on system availability is minimal from a change to a 24-month surveillance frequency. In addition, the proposed 24-month Surveillance Frequencies, if performed at the maximum interval allowed by proposed SR 3.0.2 (30 months) do not invalidate any assumptions in the plant licensing basis.

LF.1 This change revises the Current Technical Specifications (CTS) Trip Setpoints for the Improved Technical Specifications (ITS) Allowable Values. ITS Section 3.3 reflects Allowable Values consistent with the philosophy of BWR ISTS, NUREG-1433, Rev. 1. These Allowable Values have been established consistent with the methods described in ComEd's Instrument Setpoint Methodology (Nuclear Engineering Standard NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"). For most cases, the Allowable Value determinations were calculated using plant specific operating and surveillance trend data or an allowance as provided for by the Instrument Setpoint Methodology. For all other cases, vendor documented performance specifications for drift were used. The Allowable Value verification used actual plant operating and surveillance trend information to ensure the validity of the developed Allowable Value. All changes to safety analysis limits applied in the methodologies were evaluated and confirmed as ensuring safety analysis licensing acceptance limits are maintained. All design limits applied in the methodologies were confirmed as ensuring that applicable design requirements of the associated systems and equipment are maintained. The methodologies used have been

TECHNICAL CHANGES - LESS RESTRICTIVE

LF.1 (cont'd) compared with the guidance of ANSI/ISA S67.04-Part I-1994 and ANSI/ISA RP67.04-Part II-1994. Plant calibration procedures will ensure that the assumptions regarding calibration accuracy, measurement and test equipment accuracy, and setting tolerance are maintained. Setpoints for each design or safety analysis limit have been established by accounting for the applicable instrument accuracy, calibration and drift uncertainties, environmental effects, power supply fluctuations, as well as uncertainties related to process and primary element measurement accuracy using the Instrument Setpoint Methodology. The Allowable Values have been established from each design or safety analysis limit by combining the errors associated with channel/instrument calibration (e.g., device accuracy, setting tolerance, and drift) with the calculated Nominal Trip Setpoint also using the Instrument Setpoint Methodology.

Additionally, each applicable channel/instrument has been evaluated and analyzed to support a fuel cycle extension to a 24 month interval. These evaluations and analyses have been performed utilizing the guidance provided in EPRI TR-103335, "Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1. The EPRI guidance was used to demonstrate that the data collected by the operating plant (from surveillance testing) has remained acceptable and reasonable with regard to the manufacturers design specifications.

Use of the previously discussed methodologies for determining Allowable Values, instrument setpoints, and analyzing channel/instrument performance ensure that the design basis and associated safety limits will not be exceeded during plant operation. These evaluations, determinations, and analyses now form a portion of the plants design bases.

"Specific"

L.1 CTS 3.9.G requires the RPS electric power monitoring assemblies to be OPERABLE in Operation MODES 1, 2, and 3, and also in MODES 4 and 5 with any control rod withdrawn. It is proposed to revise the Applicability of CTS 3.9.G (ITS 3.3.8.2) to specify MODES 1 and 2, MODE 5 with any control rod withdrawn from a core cell containing one or more fuel assemblies. The ITS 3.3.8.2 Applicability does not include MODE 3 or 4, consistent with the Applicability of proposed ITS LCO 3.3.1.1, "RPS Instrumentation," and ITS Table 3.3.1.1-1 (see Discussion of Change L.3 below for change to MODE 5 Applicability). In addition, it is proposed to revise CTS 4.9.G Footnote b to

TECHNICAL CHANGES - LESS RESTRICTIVE

L.1 (cont'd) require performance of the Channel Functional Test Surveillance (CTS 4.9.G.1, proposed ITS SR 3.3.8.2.1) to be met prior to entry into MODE 2 consistent with the proposed change to the Applicability of CTS 3.9.G. The RPS electric power monitoring assemblies are only required to support OPERABILITY of the RPS logic and scram pilot valve solenoids. With the unit in MODE 3 or 4, all control rods are fully inserted and will remain inserted since the Reactor Mode Switch, while in the Shutdown position, enforces a control rod withdrawal block. Thus, it is not necessary for the RPS electric power monitoring assemblies to be OPERABLE in MODES 3 and 4 to support the RPS. Therefore, MODES 3 and 4 have been deleted from the Applicability of CTS 3.9.G. However, exceptions to the restrictions on control rod withdrawal provided by the Reactor Mode Switch in MODES 3 and 4 are proposed for ITS LCO 3.10.2, "Single Control Rod Withdrawal—Hot Shutdown," and ITS LCO 3.10.3, "Single Control Rod Withdrawal—Cold Shutdown." ITS LCO 3.10.2 and ITS LCO 3.10.3 will allow a single control rod to be withdrawn in MODE 3 and MODE 4, respectively, by allowing the Reactor Mode Switch to be in the Refuel Position. To address these two exceptions, ITS LCO 3.10.2 and ITS LCO 3.10.3 include Operability requirements for RPS Functions (LCO 3.3.1.1), control rods (LCO 3.9.5), and RPS electric power monitoring. This proposed change is considered acceptable since the RPS electric power monitoring assemblies will be required to be OPERABLE when necessary to support RPS OPERABILITY.

L.2 The allowed out of service time of CTS 3.9.G Action 2 for two inoperable RPS electric power monitoring assemblies is extended from 30 minutes to 1 hour in ITS 3.3.8.2 Required Action B.1 to provide sufficient time for the plant personnel to take corrective actions. The time extension for two inoperable assemblies is minimal but necessary to allow consideration of plant conditions, available personnel, and the appropriate actions.

L.3 The Applicability of CTS 3.9.G, as stated in footnote (a), includes MODE 5 only when a control rod is withdrawn. It is proposed to revise the Applicability of CTS 3.9.G (ITS 3.3.8.2) to only include MODE 5 when any control rod is withdrawn from a core cell containing one or more fuel assemblies. Control rods withdrawn from or inserted into a core cell containing no fuel assemblies have a negligible impact on the reactivity of the core and therefore are not required to be OPERABLE with the capability to scram. Provided all control rods otherwise remain inserted, the RPS Functions serve no purpose and are not required. In this condition, the required SHUTDOWN MARGIN (ITS 3.1.1) and the required one-rod-out interlock (ITS 3.9.2) ensure no event requiring RPS will occur. Thus, the RPS Functions are only required to be OPERABLE in

TECHNICAL CHANGES - LESS RESTRICTIVE

L.3 (cont'd) MODE 5 when control rods are withdrawn from core cells containing fuel assemblies. Since the RPS electric power monitoring assemblies support OPERABILITY of the RPS Functions, the proposed change revises the Applicability of CTS 3.9.G (ITS 3.3.8.2) such that the RPS electric power monitoring assemblies are required to be OPERABLE when the RPS Functions (ITS 3.3.1.1) are required to be OPERABLE. This change is considered acceptable based on adequate assurance that the RPS will be OPERABLE when required and the negligible effect on core reactivity.

L.4 CTS 3.9.G does not provide any actions if the RPS electric power monitoring assemblies are not restored or the associated RPS MG set or alternate power supply is not removed from service (which de-energizes the associated RPS bus) as required by CTS 3.9.G Actions 1 and 2. Thus, CTS 3.0.C is required to be entered. However, since CTS 3.0.C is not applicable in MODE 5, 10 CFR 50.36(c)(2) requires that the licensee notify the NRC if required by 10 CFR 50.72, and a Licensee Event Report (LER) be submitted to the NRC as required by 10 CFR 50.73. In lieu of these two requirements, a new ACTION D is provided if CTS 3.9.G Actions 1 and 2 (ITS 3.3.8.2 Required Actions of Condition A or B) are not met in MODE 5. ITS 3.3.8.2 ACTION D requires action to be initiated to fully insert all insertable control rods in core cells containing one or more fuel assemblies. This action places the reactor in the least reactive condition and ensures the safety function of the RPS instrumentation is already met.

RELOCATED SPECIFICATIONS

None

CTS 3/4.2.H

3.2 - LIMITING CONDITIONS FOR OPERATION

H. Explosive Gas Monitoring

The explosive gas monitoring instrumentation CHANNEL(s) shown in Table 3.2.H-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Specification 3.8.H are not exceeded.

APPLICABILITY:

During offgas holdup system operation.

ACTION:

1. With an explosive gas monitoring instrumentation CHANNEL alarm/trip setpoint less conservative than required by the above specification, declare the CHANNEL inoperable and take the ACTION shown in Table 3.2.H-1.
2. With less than the minimum number of explosive gas monitoring instrumentation CHANNEL(s) OPERABLE, take the ACTION shown in Table 3.2.H-1. Restore the inoperable instrumentation to OPERABLE status within 30 days and, if unsuccessful, prepare and submit a Special Report to the Commision pursuant to Specification 6.9.B to explain why this inoperability was not corrected in a timely manner.
3. The provisions of Specification 3.0.C are not applicable.

4.2 - SURVEILLANCE REQUIREMENTS

H. Explosive Gas Monitoring

Each explosive gas monitoring instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.2.H-1.

R.1

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~~TABLE 3.2.H-1~~

~~EXPLOSIVE GAS MONITORING INSTRUMENTATION~~

~~Functional Unit~~	~~Minimum CHANNEL(s) OPERABLE~~	~~ACTION~~
~~MAIN CONDENSER OFFGAS TREATMENT SYSTEM EXPLOSIVE GAS MONITORING SYSTEM~~		
~~Hydrogen Monitor~~	~~1~~	~~70~~

~~ACTION~~

~~ACTION 70 - With the number of OPERABLE CHANNEL(s) less than required by the Minimum CHANNEL(s) OPERABLE requirement, operation of the main condenser offgas treatment system may continue provided grab samples are collected at least once per 4 hours and analyzed within the following 4 hours. If the recombiner(s) temperature remains constant and THERMAL POWER has not changed, the grab sample collection frequency may be changed to 8 hours.~~

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CTS 3/4.2.H

~~TABLE 4.2.H-1~~

~~EXPLOSIVE GAS MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS~~

~~Functional Unit~~	~~CHANNEL CHECK~~	~~CHANNEL FUNCTIONAL TEST~~	~~CHANNEL CALIBRATION~~
~~MAIN CONDENSER OFFGAS TREATMENT SYSTEM EXPLOSIVE GAS MONITORING SYSTEM~~			
~~Hydrogen Monitor~~	~~D~~	~~M~~	~~Q~~

R.1

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DISCUSSION OF CHANGES
CTS: 3/4.2.H - EXPLOSIVE GAS MONITORING

ADMINISTRATIVE

None

TECHNICAL CHANGES - MORE RESTRICTIVE

None

TECHNICAL CHANGES - LESS RESTRICTIVE

None

RELOCATED SPECIFICATIONS

R.1 The CTS 3/4.2.H explosive gas monitoring instrumentation provides information only and is not considered in any design basis accident or transient. It does provide information regarding a potential explosive gas mixture in the main condenser off gas treatment system. However, the evaluation summarized in NEDO-31466 determined the loss of this instrumentation to be a non-significant risk contributor to core damage frequency and offsite release. Therefore, the requirements specified in CTS 3/4.2.H for this Function do not satisfy the NRC Policy Statement Technical Specification screening criteria as documented in the Application of Selection Criteria to the Quad Cities 1 and 2 Technical Specifications and will be relocated to the Technical Requirements Manual (TRM). The TRM will be incorporated by reference into the Quad Cities 1 and 2 UFSAR at ITS implementation. Changes to the TRM will be controlled in accordance with 10 CFR 50.59.

CTS 3/4.2.I

R.1

3.2 - LIMITING CONDITIONS FOR OPERATION

I. Suppression Chamber and Drywell Spray Actuation

The Suppression Chamber and Drywell Spray Actuation instumentation CHANNEL(s) shown in Table 3.2.I-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.2.I-1.

APPLICABILITY:

OPERATIONAL MODE(s) 1, 2 & 3.

ACTION:

With a Suppression Chamber and Drywell Spray Actuation instrumentation CHANNEL trip setpoint less conservative than the value shown in the Trip Setpoint column of Table 3.2.I-1, declare the CHANNEL inoperable and take the ACTION shown in Table 3.2.I-1.

4.2 - SURVEILLANCE REQUIREMENTS

I. Suppression Chamber and Drywell Spray Actuation

1. Each Suppression Chamber and Drywell Spray Actuation instrumentation CHANNEL shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations at the frequencies shown in Table 4.2.I-1.
2. LOGIC SYSTEM FUNCTIONAL TEST(s) of all CHANNEL(s) shall be performed at least once per 18 months.

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TABLE 3.2.I-1

SUPPRESSION CHAMBER AND DRYWELL SPRAY ACTUATION INSTRUMENTATION

Functional Unit	Trip Setpoint[a]	Minimum CHANNEL(s) per TRIP SYSTEM[c]	ACTION
1. Drywell Pressure - High (Permissive)	0.5≤ p ≤1.5 psig	2	80
2. Reactor Vessel Water Level - Low (Permissive)	≥ -48 inches	1	80

ACTION

ACTION 80 - a. With the number of OPERABLE CHANNEL(s) less than required by the Minimum OPERABLE CHANNEL(s) per TRIP SYSTEM requirement for one TRIP SYSTEM, place at least one inoperable CHANNEL in the tripped condition[b] within one hour or declare the Suppression Chamber and Drywell Spray Actuation mode of the Residual Heat Removal system inoperable.

b. With the number of OPERABLE CHANNEL(s) less than required by the Minimum OPERABLE CHANNEL(s) per TRIP SYSTEM requirement for both TRIP SYSTEM(s), declare the Suppression Chamber and Drywell Spray Actuation mode of the Residual Heat Removal system inoperable.

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[a] Reactor vessel water level settings are expressed in inches above the top of active fuel (which is 360 inches above vessel zero).

[b] If an instrument is inoperable, it shall be placed (or simulated) in a tripped condition so that it will not prevent a containment spray.

[c] A CHANNEL may be placed in an inoperable status for up to 2 hours for required surveillance without placing the CHANNEL in the tripped condition provided the Functional Unit maintains Suppression Chamber and Drywell Spray Actuation capability.

CTS 3/4.2.I

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R.1

CTS 3/4.2.I

TABLE 4.2.I-1

SUPPRESSION CHAMBER AND DRYWELL SPRAY ACTUATION INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Functional Unit	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION
1. Drywell Pressure - (Permissive)	NA	M	Q
2. Reactor Vessel Water Level - Low (Permissive)	D	M	E[a]

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[a] Trip units are calibrated at least once per 31 days and transmitters are calibrated at the frequency indicated in the table.

K.1

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DISCUSSION OF CHANGES
CTS: 3/4.2.I - SUPPRESSION CHAMBER AND DRYWELL SPRAY ACTUATION

ADMINISTRATIVE

None

TECHNICAL CHANGES - MORE RESTRICTIVE

None

TECHNICAL CHANGES - LESS RESTRICTIVE

None

RELOCATED SPECIFICATIONS

R.1 The Suppression Chamber and Drywell Spray Actuation instrumentation requirements specified in CTS 3/4.2.I are in the Technical Specifications to ensure the Operability of the associated systems. A failure of the instrumentation to function would preclude the spray valves from being opened from the control room. However, the instrument can be overriden to allow operation from the control room. An evaluation has been performed and summarized in Appendix B of the Application of Selection Criteria to the Quad Cities 1 and 2 Technical Specifications which determined the loss of this instrumentation to be a non-significant risk contributor to core damage frequency and offsite release. Therefore, the requirements specified in CTS 3/4.2.I do not satisfy the NRC Policy Statement Technical Specification screening criteria as documented in the Application of Selection Criteria to the Quad Cities 1 and 2 Technical Specifications and will be relocated to the Technical Requirements Manual (TRM). The TRM will be incorporated by reference into the Quad Cities 1 and 2 UFSAR at ITS implementation. Changes to the TRM will be controlled in accordance with 10 CFR 50.59.

CTS 3/4.2.K

R.1

3.2 - LIMITING CONDITIONS FOR OPERATION

K. Toxic Gas Monitoring

The toxic gas monitoring system shall be OPERABLE with the alarm/trip setpoints adjusted to actuate at an ammonia concentration of less than or equal to 50 ppm.

APPLICABILITY:

All OPERATIONAL MODE(s).

ACTION:

1. With the toxic gas monitoring system inoperable, within one hour initiate and maintain operation of the control room ventilation system in the isolation mode of operation.

4.2 - SURVEILLANCE REQUIREMENTS

K. Toxic Gas Monitioring

The toxic gas monitoring system shall be demonstrated OPERABLE by performance of a:

1. CHANNEL CHECK at least once per 12 hours,
2. CHANNEL FUNCTIONAL TEST at least once per 31 days, and
3. CHANNEL CALIBRATION at least once per 18 months.

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DISCUSSION OF CHANGES
CTS: 3/4.2.K - TOXIC GAS MONITORING

ADMINISTRATIVE

None

TECHNICAL CHANGES - MORE RESTRICTIVE

None

TECHNICAL CHANGES - LESS RESTRICTIVE

None

RELOCATED SPECIFICATIONS

R.1 The CTS 3/4.2.K toxic gas monitoring system ensures sufficient capability is available to promptly detect and initiate protective action in the event of an accidental ammonia release. This capability is required to protect control room personnel. However, the instruments are not assumed to mitigate a design basis accident (DBA) or transient since an accidental ammonia release is not a DBA or transient. It does provide information that may indicate a possible leak across the boundary of a specific system. However, the evaluation summarized in NEDO-31466 determined the loss of this instrumentation to be a non-significant risk contributor to core damage frequency and offsite release. Therefore, the requirements specified in CTS 3/4.2.K for this Function do not satisfy the NRC Policy Statement Technical Specification screening criteria as documented in the Application of Selection Criteria to the Quad Cities 1 and 2 Technical Specifications and will be relocated to the Technical Requirements Manual (TRM). The TRM will be incorporated by reference into the Quad Cities 1 and 2 UFSAR at ITS implementation. Changes to the TRM will be controlled in accordance with 10 CFR 50.59.

DISCUSSION OF CHANGES
ITS: SECTION 3.3 - INSTRUMENTATION BASES

The Bases of the current Technical Specifications for this section (pages B 2-5 through B 2-11, B 3/4.1-1 through B 3/4.1-3, and B 3/4.2-1 through B 3/4.2-5) have been completely replaced by revised Bases that reflect the format and applicable content of the Quad Cities 1 and 2 ITS Section 3.3, consistent with the BWR ISTS, NUREG-1433, Rev. 1. The revised Bases are as shown in the Quad Cities 1 and 2 ITS Bases.