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MAR 1 2 2007

U. S. Nuclear Regulatory Commission
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Mail Stop OP1-17
Washington, DC 20555-0001

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED LICENSE AMENDMENT
NO. 279 FOR UNIT 1 OPERATING LICENSE NO. NPF-14 AND
NO. 248 FOR UNIT 2 OPERATING LICENSE NO. NPF-22
ARTS/MELLLA IMPLEMENTATION - SUPPLEMENT **Docket Nos. 50-387**
PLA-6169 **and 50-388**

References: 1) PLA-5931, B. T. McKinney (PPL) to Document Control Desk (USNRC), "Susquehanna Steam Electric Station Proposed License Amendment No. 279 for Unit 1 Operating License No. NPF-14 and 248 for Unit 2 Operating License No. NPF-22 ARTS/MELLLA Implementation," dated November 18, 2005.

In accordance with 10 CFR 50.90, PPL Susquehanna, LLC (PPL) submitted a request for a license amendment to the Susquehanna Steam Electric Station (SSES) Unit 1 and Unit 2 Technical Specifications to implement an expanded operating domain resulting from the implementation of Average Power Range Monitor/Rod Block Monitor/ Technical Specifications/Maximum Extended Load Line Limit Analysis (ARTS/MELLLA) (Reference 1).

The purpose of this letter is to provide a supplement based on teleconferences held on March 6, 8 and 9, 2007 with the NRC staff.

PPL has reviewed the "No Significant Hazards Consideration" and the "Environmental Consideration" submitted with Reference 1 relative to this supplement. We have confirmed that the "No Significant Hazards Consideration" remains accurate.

PPL respectfully requests that NRC expeditiously complete the review and approval of the proposed ARTS/MELLLA License Amendment Request proposed in Reference 1. PPL continues to install ARTS/MELLLA in Unit 2 and requests approval prior to startup from the Spring 2007 Outage.

A001

If you have any questions or require additional information, please contact Mr. Michael Crowthers at (610) 774-7766.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: 3/12/07

for B. T. McKinney

Enclosure: PPL ARTS/MELLLA Supplement

cc: NRC Region I
Mr. A. J. Blamey, NRC Sr. Resident Inspector
Mr. R. V. Guzman, NRC Project Manager
Mr. R. Janati, DEP/BRP

ENCLOSURE TO PLA-6169

PPL ARTS/MELLLA SUPPLEMENT

1. DESCRIPTION

This supplement proposes three different sets of changes. The first proposes to add two notes (i) and (j) to TS Table 3.3.2.1-1 to address NRC concerns that the technical specification requirements for Limiting Safety System Settings (LSSS) that protect the reactor core or the Reactor Coolant System (RCS) pressure boundary Safety Limits may not be fully in compliance with the intent of 10 CFR 50.36. The second revises the changes originally proposed to SR 3.3.2.1.4 and TS Table 3.3.2.1-1 in the original PPL ARTS/MELLLA Amendment request. The third revises the completion times for RBM inoperability specified in LCO 3.3.2.1 Conditions A and B.

2. PROPOSED CHANGES

2.1 Change to add notes to TS Table 3.3.2.1-1:

The marked-up pages for the proposed changes to the Technical Specifications (TS) are included in Attachment 1. For completeness, this supplement includes all the marked-up pages for the proposed changes to the Control Rod Block TS LCO 3.3.2.1 associated with the ARTS/MELLLA license amendment request, including those pages that are not affected by this supplemental submittal. TS pages 3.3-20 for both Units 1 and 2 are affected. Markups of the TS bases pages are included in Attachment 2 for information. Three additional inserts (TSTF-B1, TSTF-B2 and TSTF B3) are being added to the TS Bases.

Two notes (i) and (j) are added to TS Table 3.3.2.1-1 for SR 3.3.2.1.7 associated with the power dependent RBM functions. The notes (designated as inserts TSTF-1 and TSTF-2 in Attachment 1) are added to address NRC's concerns that the technical specification requirements for Limiting Safety System Settings (LSSS) that protect the reactor core or the Reactor Coolant System (RCS) pressure boundary Safety Limits may not be in compliance with the intent of 10 CFR 50.36. The note (i) requires the channel to be evaluated to verify that it is functioning as required before returning the channel to service should the as-found setting not be the Nominal Trip Setpoint (NTSP). The note (j) specifies that the instrument channel setpoint shall be reset to the NTSP at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Finally, the note (j) identifies the document that specifies the NTSP and the methodology used to determine the NTSP. This information will be contained in the SSES Final Safety Analysis Report (FSAR) which is a document controlled under 10 CFR 50.59.

2.2 Revision to changes originally proposed to SR 3.3.2.1.4 and TS Table 3.3.2.1-1:

This revision affects two TS inserts ARTS-1 and ARTS-3. The marked-up pages are contained in Attachment 1. Mark-ups of the corresponding revised inserts (ARTS-B3 and ARTS-B4) are contained in Attachment 2.

The original ARTS/MELLLA submittal proposed modifications to the presentation of requirements shown in NUREG 1433 for SR 3.3.2.1.4 and Table 3.3.2.1-1. The revisions proposed herein to inserts ARTS-1 and ARTS-3 make the SR 3.3.2.1.4 and Table 3.3.2.1-1 requirements consistent with NUREG-1433.

2.3 Revision to RBM inoperable condition completion times:

TS LCO 3.3.2.1 Condition A and B completion times are proposed to be changed to be consistent with NUREG 1433 completion times. The affected TS pages are 3.3-16 for both Units 1 and 2.

3. TECHNICAL ANALYSIS

3.1 Change to add notes to TS Table 3.3.2.1-1:

Two notes are added to TS Table 3.3.2.1-1 for SR 3.3.2.1.7 associated with the RBM power dependent range functions that prescribe additional requirements. These additional requirements increase assurance that the instrumentation will function as required and will be restored to a condition consistent with the assumptions specified in the applicable safety analysis.

The RBM Functions are Functions that are LSSSs for reactor core Safety Limits. The note (i) requires evaluation of channel performance for the condition where the as-found setting for the channel setpoint is not the NTSP but is conservative with respect to the Allowable Value. For digital channel components, no as-found tolerance or as-left tolerance can be specified. Evaluation of instrument performance will verify that the instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. These channels will also be identified in the Corrective Action Program. Entry into the Corrective Action Program will ensure required review and documentation of the condition for continued OPERABILITY. The note (j) requires that the as-left setting for the instrument be returned to the NTSP. If the as-left instrument setting cannot be returned to the NTSP, then the instrument channel shall be declared inoperable. The note (j) also requires that the NTSP and the methodologies for calculating the NTSP be in a document controlled by 10 CFR 50.59.

3.2 Revision to changes originally proposed to SR 3.3.2.1.4 and TS Table 3.3.2.1-1:

The revision to the SR 3.3.2.1.4 and Table 3.3.2.1-1 requirements are needed to provide consistency with the Improved Technical Specification Standard NUREG 1433.

3.3 Revision to changes originally proposed to SR 3.3.2.1.4 and TS Table 3.3.2.1-1:

The change to the RBM inoperable Condition A and B completion times is required to provide consistency with the Improved Technical Specification Standard NUREG 1433.

4. REGULATORY SAFETY ANALYSIS

4.1 No Significant Hazards Consideration

The analysis provided in the NSHC provided in the original ARTS/MELLLA submittal has been reviewed. The analysis contained therein remains valid and is not affected by the changes proposed herein.

4.2 Applicable Regulatory Requirements/Criteria

The Regulatory analysis provided in the original ARTS/MELLLA submittal is not impacted.

The addition of the proposed notes addresses the below Regulatory Requirement, which was not previously addressed in the ARTS/MELLLA submittal:

Title 10 of the Code of Federal Regulations, Part 50.36, requires plant Technical Specifications to contain LSSS so chosen that automatic protective action will correct the abnormal situation before a safety limit is exceeded. The proposed change revises and clarifies the Technical Specifications to ensure this requirement is met.

4.3 Conclusion

Based on the analyses provided in the original submittal and the added evaluation described above, the proposed change is consistent with applicable regulatory requirements and criteria. In conclusion, there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, such activities will be conducted in compliance with the Commission's regulations, and the approval of the proposed change will not be inimical to the common defense and security or to the health and safety of the public.

5. ENVIRONMENTAL CONSIDERATION

The environmental consideration provided in the original ARTS/MELLLA submittal is not affected by the proposed changes.

Attachment 1 to PLA-6169

Proposed Technical Specifications Changes
(Mark-up)

TS's affected by this proposed supplement:

- Completion times for RBM inoperable conditions A and B of LCO 3.3.2.1
- Insert ARTS-1, ARTS-2, ARTS-3
- The following Inserts have been added:TSTF-1 and TSTF-2

Technical Specifications Changes
Unit 1
(Mark-up)

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	~~5 days~~ 24 hours
B. Required Action and associated Completion Time of Condition A not met. OR Two RBM channels inoperable.	B.1	Place one RBM channel in trip.	~~48~~ 1 hour~~s~~
C. Rod worth minimizer (RWM) inoperable during reactor startup.	C.1	Suspend control rod movement except by scram.	Immediately
	OR		
	C.2.1.1	Verify ≥ 12 rods withdrawn.	Immediately
	OR		
	C.2.1.2	Verify by administrative methods that startup with RWM inoperable has not been performed in the last calendar year.	Immediately
	AND		(continued)

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 184 P
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. Verify the RBM Trip Functions are not bypassed when THERMAL POWER is ≥ 30% RTP.	DELETE A 24 months
SR 3.3.2.1.5	Verify the RWM is not bypassed when THERMAL POWER is ≤ 10% RTP.	24 months

(continued)

INSERT ARTS-1 A

INSERT ARTS -1:

Verify the RBM:

a. Low Power Range - Upscale Function ~~OR Intermediate Power Range - Upscale Function OR High Power Range - Upscale Function~~ is ~~enabled (~~not bypassed~~)~~ when APRM Simulated Thermal Power is ≥ 28% RTP and ≤ Intermediate Power Range Setpoint specified in the COLR.

b. Intermediate Power Range - Upscale Function ~~OR High Power Range - Upscale Function~~ is ~~enabled (~~not bypassed~~)~~ when APRM Simulated Thermal Power is > ~~≥~~ Intermediate Power Range Setpoint specified in the COLR and ≤ High Power Range setpoint specified in the COLR.

c. High Power Range - Upscale Function is ~~enabled (~~not bypassed~~)~~ when APRM Simulated Thermal Power is > High Power Range Setpoint specified in the COLR.

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

A

INSERT ARTS-2

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Rod Block Monitor				
a. Low Power Range-Upscale	1(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	≤ 0.58W+55%(b)
d. ~~b.~~ Inop	~~1(a)~~ (d)(e)	2	SR 3.3.2.1.1 ~~SR 3.3.2.1.4~~	NA
c. Downscale	1(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	≥ 3/125 divisions of full scale
2. Rod Worth Minimizer	1(c), 2(c) (g)	1	SR 3.3.2.1.2 SR 3.3.2.1.3 SR 3.3.2.1.5 SR 3.3.2.1.8	NA
3. Reactor Mode Switch—Shutdown Position	(d) (h)	2	SR 3.3.2.1.6	NA

DELETE

delete per PCAF 6143

DELETE

(a) When THERMAL POWER is ≥ 30% RPT

(b) ~~≤ 0.58W + 50% RTP when reset for single loop operation per LCO 3.4.1, "Recirculation Loops Operating"~~

DELETE

(g) ~~(c)~~ With THERMAL POWER ≤ 10% RTP.

(h) ~~(d)~~ Reactor mode switch in the shutdown position.

P INSERT 10

A INSERT ARTS-3

A

(i)

(j)

Insert TSTF-1

Insert TSTF-2

Insert TSTF-1:

If the as-found channel setpoint is not the Nominal Trip Setpoint but is conservative with respect to the Allowable Value, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

Insert TSTF - 2:

The instrument channel setpoint shall be reset to the Nominal Trip Setpoint at the completion of the surveillance; otherwise, the channel shall be declared inoperable. The methodology used to determine the NTSP is specified in the SSES Final Safety Analysis Report.

NTSP and the

INSERT 10: P

(b) $0.58(W-\Delta W) + 55\%$ RTP when reset for single loop operation per LCO 3.4.1, "Recirculation Loops Operating." For single loop operation the value of $\Delta W = 5\%/0.58$. For two loop operation, the value of $\Delta W = 0$.

DELETE

A

(i)(j)

INSERT ARTS-2: A

a. Low Power Range - Upscale	(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	(f)
b. Intermediate Power Range - Upscale	(b)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	(f)
c. High Power Range - Upscale	(c), (d)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	(f)

and ≤ Intermediate Power Range Setpoint specified in the COLR

INSERT ARTS-3: A

a. THERMAL POWER is ≥ 28% RTP and MCPR is less than the limit specified in the COLR ~~except not required to be OPERABLE if the Intermediate Power Range - Upscale Function or High Power Range - Upscale Function is OPERABLE~~.

b. THERMAL POWER is > ~~≥~~ Intermediate Power Range Setpoint specified in the COLR and MCPR is less than the limit specified in the COLR ~~except not required to be OPERABLE if the High Power Range - Upscale Function is OPERABLE~~.

c. THERMAL POWER is > ~~≥~~ High Power Range Setpoint specified in the COLR and < 90% RTP and MCPR is less than the limit specified in the COLR.

d. THERMAL POWER is ≥ 90% RTP and MCPR is less than the limit specified in the COLR.

e. THERMAL POWER is ≥ 28% RTP and < 90% RTP and MCPR is less than the limit specified in the COLR.

f. Allowable Value specified in the COLR.

and ≤ High Power Range setpoint specified in the COLR.

Technical Specifications Changes
Unit 2
(Mark-up)

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.	~~5 days~~ 24 hours
B. Required Action and associated Completion Time of Condition A not met. OR Two RBM channels inoperable.	B.1 Place one RBM channel in trip.	~~48~~ 1 hour~~s~~
C. Rod worth minimizer (RWM) inoperable during reactor startup.	C.1 Suspend control rod movement except by scram. OR 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. AND	Immediately Immediately Immediately (continued)

SURVEILLANCE REQUIREMENTS

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 184 P
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. Verify the RBM trip functions are not bypassed when THERMAL POWER is ≥ 30%.	DELETE A 24 months
SR 3.3.2.1.5	Verify the RWM is not bypassed when THERMAL POWER is ≤ 10% RTP.	24 months

INSERT ARTS-1 A

INSERT ARTS -1:

Verify the RBM:

a. Low Power Range - Upscale Function ~~OR Intermediate Power Range - Upscale Function OR High Power Range - Upscale Function~~ is ~~enabled (~~not bypassed~~)~~ when APRM Simulated Thermal Power is ≥ 28% RTP and ≤ Intermediate Power Range Setpoint specified in the COLR.

b. Intermediate Power Range - Upscale Function ~~OR High Power Range - Upscale Function~~ is ~~enabled (~~not bypassed~~)~~ when APRM Simulated Thermal Power is > ~~≥~~ Intermediate Power Range Setpoint specified in the COLR and ≤ High Power Range setpoint specified in the COLR.

c. High Power Range - Upscale Function is ~~enabled (~~not bypassed~~)~~ when APRM Simulated Thermal Power is ~~≥~~ > High Power Range Setpoint specified in the COLR.

Table 3.3.2.1-1 (page 1 of 1)

Control Rod Block Instrumentation

INSERT ARTS-2

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Rod Block Monitor				
a. Low Power Range-Upscale	1(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	≤ 0.58W+55%(b)
~~b.~~ d Inop	~~1(a)~~ (d)(e)	2	SR 3.3.2.1.1 ~~SR 3.3.2.1.4~~	NA
c. Downscale	1(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	≥ 3/125 divisions of full scale
2. Rod Worth Minimizer	1(c), 2(c) (g)	1	SR 3.3.2.1.2 SR 3.3.2.1.3 SR 3.3.2.1.5 SR 3.3.2.1.8	NA
3. Reactor Mode Switch—Shutdown Position	(d) (h)	2	SR 3.3.2.1.6	NA

DELETE

Delete pot PCA 6/43

DELETE

(a) When THERMAL POWER is ≥ 30% RPT

(b) ~~≤ 0.58W + 50% RTP when reset for single loop operation per LCO 3.4.1, "Recirculation Loops Operating"~~

DELETE

DELETE

(g) ~~(c)~~ With THERMAL POWER ≤ 10% RTP.

(h) ~~(d)~~ Reactor mode switch in the shutdown position.

INSERT 10

P

INSERT ARTS-3

A

A

(i)

(j)

INSERT TSTF-1

INSERT TSTF-2

Insert TSTF-1:

If the as-found channel setpoint is not the Nominal Trip Setpoint but is conservative with respect to the Allowable Value, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

Insert TSTF - 2:

The instrument channel setpoint shall be reset to the Nominal Trip Setpoint at the completion of the surveillance; otherwise, the channel shall be declared inoperable. The NTSP and the methodology used to determine the NTSP is specified in the SSES Final Safety Analysis Report.

INSERT 10: P

(b) $0.58(W-\Delta W) + 55\%$ RTP when reset for single loop operation per LCO 3.4.1, "Recirculation Loops Operating." For single loop operation the value of ΔW = 5%/0.58. For two loop operation, the value of $\Delta W = 0$.

DELETE

A

{(i)(j)}

INSERT ARTS-2: A

a. Low Power Range - Upscale	(a)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	(f)
b. Intermediate Power Range - Upscale	(b)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	(f)
c. High Power Range - Upscale	(c), (d)	2	SR 3.3.2.1.1 SR 3.3.2.1.4 SR 3.3.2.1.7	(f)

and ≤ Intermediate Power Range Setpoint specified in the COLR

INSERT ARTS-3: A

a. THERMAL POWER is ≥ 28% RTP and MCPR is less than the limit specified in the COLR. ~~except not required to be OPERABLE if the Intermediate Power Range - Upscale Function or High Power Range - Upscale Function is OPERABLE~~.

b. THERMAL POWER is ~~≥~~ > Intermediate Power Range Setpoint specified in the COLR and MCPR is less than the limit specified in the COLR. ~~except not required to be OPERABLE if the High Power Range - Upscale Function is OPERABLE~~.

c. THERMAL POWER is ~~≥~~ > High Power Range Setpoint specified in the COLR and < 90% RTP and MCPR is less than the limit specified in the COLR.

d. THERMAL POWER is ≥ 90% RTP and MCPR is less than the limit specified in the COLR.

e. THERMAL POWER is ≥ 28% RTP and < 90% RTP and MCPR is less than the limit specified in the COLR.

f. Allowable Value specified in the COLR.

and ≤ High Power Range setpoint specified in the COLR.

Attachment 2 to PLA-6169

Technical Specifications Bases Changes For Information (Mark-up)

Changes to the TS bases made by this supplement are as follows:

- TS Bases markup Insert ARTS B2 was revised by PLA-6130 dated 12/1/2006, therefore the revised Insert ARTS B2 is included herein rather than the original ARTS Insert B2. This has been revised to delete one sentence as shown on the markup.
- Statement added to the background section identifying that the RBM is credited to preclude MCPR Safety Limit violation.
- Also, TS bases pages 3.3-46 has been revised to change the "4" to a "3" as shown on the markups.
- TSTF-B1 and TSTF-B2 and TSTF-B3 have been added.
- The last 2 sentences of ARTS -B3 have been deleted.
- ARTS-B4 has been completely revised to be consistent with NUREG 1433 except for a couple of minor changes as shown on the markup.

Technical Specifications Bases Changes
For Information
Unit 1
(Mark-up)

It is assumed to function to block further control rod withdrawal to preclude a MCPR Safety Limit violation.

B 3.3 INSTRUMENTATION

B 3.3.2.1 Control Rod Block Instrumentation

BASES

INSERT TSTF-B1

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.

A

INSERT ARTS B1

P

INSERT B16

A

The purpose of the RBM is to limit control rod withdrawal if localized neutron flux exceeds a predetermined setpoint during control rod manipulations. The RBM supplies a trip signal to the Reactor Manual Control System (RMCS) to appropriately inhibit control rod withdrawal during power operation above the low power range setpoint. 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 at various core heights surrounding the control rod being withdrawn. ~~A signal from one average power range monitor (APRM) channel assigned to each Reactor Protection System (RPS) trip system supplies a reference signal for the RBM channel in the same trip system.~~ DELETE This reference signal is used to enable the RBM. If the APRM is indicating less than the low power range setpoint, the RBM is automatically bypassed. The RBM is also automatically bypassed if a peripheral control rod is selected (Ref. 2).

The purpose of the RWM is to control rod patterns during startup, 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. Prescribed control rod sequences are 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

(continued)

Insert TSTF-B1

The Nominal Trip Setpoint (NTSP) is a predetermined setting for a protective device chosen to ensure automatic actuation prior to the process variable reaching the Analytical Limit and thus ensuring that the Safety Limit (SL) would not be exceeded. The NTSP accounts for various uncertainties. As such, the NTSP meets the definition of a Limiting Safety System Setting (LSSS)~~.~~ because ~~If the setting of~~ the protective instrument channel ~~does not~~ actuates to protect a reactor core or RCS pressure boundary Safety Limit, t~~he NTSP is not an LSSS.~~ Rod Block Monitor functions 1a,1b and 1c are LSSSs.

Technical Specifications contain values related to the OPERABILITY of equipment required for safe operation of the facility. OPERABLE is defined in Technical Specifications as "...being capable of performing its specified safety function(s)." For automatic protective devices related to SLs, the required safety function is to ensure that a SL is not exceeded and therefore the NTSP is the LSSS, as defined by 10 CFR 50.36. However, use of the NTSP to define OPERABILITY in Technical Specifications would be an overly restrictive requirement if it were applied as an OPERABILITY limit for the "as-found" value during a Surveillance. This would result in Technical Specification compliance problems, as well as reports and corrective actions required by the rule which are not necessary to ensure safety.

Use of the NTSP to define "as-found" OPERABILITY under the expected circumstances described above would result in actions required by both the rule and Technical Specifications that are not warranted. However, there is also some point beyond which the device would have not been able to perform its function due, for example, to greater than expected drift. This value needs to be specified in the Technical Specifications in order to define OPERABILITY of the devices and is designated as the Allowable Value which, is the least conservative value of the as-found setpoint that a channel can have during testing.

The Allowable Value specified in SR 3.3.2.1.7 is the least conservative value of the as-found setpoint that a channel can have when tested, such that a channel is OPERABLE if the setpoint is found conservative with respect to the Allowable Value during the CHANNEL CALIBRATION.

INSERT B16: P

An APRM flux signal from one of the four redundant average power range monitor (APRM) channels supplies a reference signal for one of the RBM channels and an APRM flux signal from another of the APRM channels supplies the reference signal to the second RBM channel.

DELETE

A

INSERT ARTS B1: A

A simulated thermal power signal from one of the four redundant average power range monitor (APRM) channels supplies a reference signal for one of the RBM channels and a simulated thermal power signal from another of the APRM channels supplies the reference signal to the second RBM channel. This reference signal is used to determine which RBM range setpoint (low, intermediate, or high) is enabled. If the APRM simulated thermal power is

BASES

BACKGROUND (continued)

based position indication for each control rod. The RWM also uses steam flow signals to determine when the reactor power is above the preset power level at which the RWM is automatically bypassed (Ref. 1). The RWM is a single channel system that provides input into RMCS rod block channel 2.

The function of the individual rod sequence steps (banking steps) is to minimize the potential reactivity increase from postulated CRDA at low power levels. However, if the possibility for a control rod to drop can be eliminated, then banking steps at low power levels are not needed to ensure the applicable event limits can not be exceeded. The rods may be inserted without the need to stop at intermediate positions since the possibility of a CRDA is eliminated by the confirmation that withdrawn control rods are coupled.

To eliminate the possibility of a CRDA, administrative controls require that any partially inserted control rods, which have not been confirmed to be ~~coupled since their last withdrawal, be fully inserted prior to reaching the~~ THERMAL POWER of ≤10% RTP. If a control rod has been checked for coupling at notch 48 and the rod has not been moved inward, this rod is in contact with it's drive and is not required to be fully inserted prior to reaching the THERMAL POWER of ≤10% RTP. However, if it cannot be confirmed that the control rod has been moved inward, then that rod shall be fully inserted prior to reaching the THERMAL POWER of ≤10% RTP. The remaining control rods may then be inserted without the need to stop at intermediate positions since the possibility of a CRDA has been eliminated.

Insert TSTF-82

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 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

A

INSERT ARTS B1A

1. Rod Block Monitor

DELETE

The RBM is designed to limit control rod withdrawal if localized neutron flux exceeds a predetermined setpoint. The RBM was originally designed to

(continued)

Insert TSTF-B2 (actual trip setpoints)

Allowable Values are specified for each applicable Rod Block Function listed in Table 3.3.2.1-1. The NTSPs are selected to ensure that the ~~actual~~ setpoints are conservative with respect to the Allowable Value. A channel is inoperable if its actual trip setpoint is non-conservative with respect to its required Allowable Value.

NTSPs 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 Analytical Limits are derived from the limiting values of the process parameters obtained from the safety analysis. The Allowable Values are derived from the Analytical Limits, corrected for calibration, process, and some of the instrument errors. The NTSPs are then determined, accounting for the remaining channel uncertainties. The trip setpoints derived in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, and drift are accounted for.

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

Insert ARTS B1A — A

The RBM is designed to limit control rod withdrawal if localized neutron flux exceeds a predetermined setpoint. The analytical methods and assumptions used in evaluating the RWE event are summarized in Reference 14. The fuel thermal performance as a function of RBM Allowable Value is determined from the analysis. The Allowable Values are chosen as a function of power level. Based on the specified Allowable Values, operating limits are established.

NTSP and

NTSP

The RBM is designed to prevent violation of the MCPRSL and the cladding 1% strain Fuel design limit that may result from a single control rod withdrawal (RWE) event.

For Information Only

BASES

DELETE

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

prevent fuel damage during a Rod Withdrawal Error (RWE) event while operating in the power range in a normal mode of operation. FSAR 15.4.2 (Ref. 10) (Rod Withdrawal Error - At Power) originally took credit for the RBM automatically actuating to stop control rod motion and preventing fuel damage during an RWE event at power. However, current reload analyses do not take credit for the RBM system. The Allowable Values are chosen as a function of power level to not exceed the APRM scram setpoints.

A

The RBM function satisfies Criterion ~~4~~ 3 of the NRC Policy Statement (Ref. 7).

Two channels of the RBM are required to be OPERABLE, with their setpoints within the appropriate Allowable Value for the associated power range, to ensure that no single instrument failure can preclude a rod block for this Function. The actual setpoints are calibrated consistent with applicable setpoint methodology.

A

INSERT ARTS B2

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. The Allowable Values are derived from the analytic limits, corrected for calibration, process, and some of the instrument errors. The trip setpoints are then determined accounting for the remaining instrument errors (e.g., drift). The trip setpoints derived in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, instrument drift, and severe environment errors (for channels that must function in harsh environments as defined by 10 CFR 50.49) are accounted for.

DELETE

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A

INSERT ARTS B3

The RBM will function when operating greater than ~~30%~~ 28 or equal to RTP. Below this power level, the RBM is not required to be OPERABLE.

A

2. Rod Worth Minimizer

The RWM enforces the banked position withdrawal sequence (BPWS) to ensure that the initial conditions of the CRDA analysis are not violated.

(continued)

TS Bases Insert ARTS B2 (Revised)

Nominal ~~T~~trip setpoints are those predetermined values of output at which an action should take place. The trip setpoints are compared to the actual process parameter, the calculated RBM flux (RBM channel signal). When the normalized RBM flux value exceeds the applicable trip setpoint, the RBM provides a trip output.

The analytic limits are derived from the limiting values of the process parameters. Using the GE setpoint methodology, based on ISA RP 67.04, Part II " Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation" setpoint calculation Method 2, the RBM Allowable Values are determined from the analytical limits using the statistical combination of the RBM input signal calibration error, process measurement error, primary element accuracy and instrument accuracy under trip conditions. Accounting for these errors assures that a setpoint found during calibration at the Allowable Value has adequate margin to protect the analytical limit thereby protecting the Safety Limit.

For the digital RBM, there is a normalization process initiated upon rod selection, so that only RBM input signal drift over the interval from the rod selection to rod movement needs to be considered in determining the nominal trip setpoints. The RBM has no drift characteristic with no as-left or as-found tolerances since it only performs digital calculations on the digitized input signals provided by the APRMs.

~~The Allowable Value is the Limiting Safety System Setting since the RBM has no drift characteristic~~. The RBM Allowable Value demonstrates that the analytic limit would not be exceeded, thereby protecting the safety limit. The Nominal trip setpoints and Allowable Values determined in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, instrument drift, and environment errors are accounted for and appropriately applied for the RBM. There are no margins applied to the RBM nominal trip setpoint calculations which could mask RBM degradation.

INSERT ARTS B3:

The RBM selects one of three different RBM flux trip setpoints to be applied based on the current value of THERMAL POWER. THERMAL POWER is indicated to each RBM channel by a simulated thermal power (STP) reference signal input from an associated reference APRM channel. The OPERABLE range is divided into three "power ranges," a "low power range," an "intermediate power range," and a "high power range." The RBM flux trip setpoint applied within each of these three power ranges is, respectively, the "low trip setpoint," the "intermediate trip setpoint," and the "high trip setpoint" (Allowable Values for which are defined in the COLR). To determine the current power range, each RBM channel compares its current STP input value to three power setpoints, the "low power setpoint",(28%), the "intermediate power setpoint" (current value defined in the COLR), and the "high power setpoint" (current value defined in the COLR), which define, respectively, the lower limit of the low power range, the lower limit of the intermediate power range, and the lower limit of the high power range. The trip setpoint applicable for each power range is more restrictive than the corresponding setpoint for the lower power range(s). When STP is below the low power setpoint, the RBM flux trip outputs are automatically bypassed but the low trip setpoint continues to be applied to indicate the RBM flux setpoint on the NUMAC RBM displays.

The calculated ~~(required)~~ setpoints and applicable power ranges are bounding values. ~~In the equipment implementation, it is necessary to apply a "deadband" to each setpoint. The~~ deadband is applied to the RBM trip setpoint selection logic and the RBM trip automatic bypass logic such that the setpoint being applied is always equal to or more conservative than the required setpoint. Since the RBM flux trip setpoint applicable to the higher power ranges are more conservative than the corresponding trip setpoints for lower power ranges, the trip setpoint applicable to the higher power range (high power range or intermediate power range) continues to be applied when STP decreases below the lower limit of that range until STP is below the power range setpoint by a value exceeding the deadband. Similarly, when STP decreases below the low power setpoint, the automatic bypass of RBM flux trip outputs will not be applied until STP decreases below the trip setpoint a value exceeding the deadband.

The RBM channel uses THERMAL POWER, as represented by the STP input value from its reference APRM channel, to automatically enable RBM flux trip outputs (remove the automatic bypass) and to select the RBM flux trip setpoint to be applied. However, the RBM Upscale function is only required to be OPERABLE when the MCPR values are less than the values defined in the COLR, depending on the THERMAL POWER level. Therefore, even though the RBM Upscale Function is implemented in each RBM channel as a single trip function with a selected trip setpoint, it is characterized in Table 3.3.2.1-1 as three Functions, the Low Power Range – Upscale Function, the Intermediate Power Range – Upscale Function, and the High Power Range – Upscale Function, to facilitate correct definition of the OPERABILITY requirements for the Functions. Each Function corresponds to one of the RBM power ranges. Due to the deadband effects on the determination of the current power range, the transition between these three Functions will occur at slightly different THERMAL POWER levels for increasing power versus decreasing power. ~~Since the RBM flux trip setpoints applied for the higher power ranges are more conservative, the OPERABILITY requirement for the Low Power Range – Upscale Function is satisfied if the Intermediate Power Range – Upscale Function or the High Power Range – Upscale Function is OPERABLE. Similarly, the OPERABILITY requirement for the Intermediate Power Range – Upscale Function is satisfied if the High Power Range – Upscale Function is OPERABLE.~~

BASES (continued)

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 ~~5 days~~ 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 ~~48~~ (1) hour~~s~~. 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.

(1)

The ~~48~~ 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.

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 was not performed in the last calendar year, i.e. the last 12 months. 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. A reactor startup with an inoperable RWM is defined as rod withdrawal during startup when the RWM is required to be OPERABLE. 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

(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 Multiplexing System input. The Frequency of ~~92~~ 184 days is based on reliability analyses ~~(Ref. 8)~~ (Refs. 8, 12, and 13).

P

P

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 verifying proper indication of the selection error of at least one out-of-sequence control rod. 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 in MODE 2. As noted, 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 for SR 3.3.2.1.2, and entry into MODE 1 when THERMAL POWER is ≤ 10% RTP for SR 3.3.2.1.3, to perform the required Surveillance 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. The Frequencies are based on reliability analysis (Ref. 8).

INSERT ARTS B4

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SR 3.3.2.1.4

DELETE

The RBM trips are automatically bypassed when power is below a specified value and a peripheral control rod is not selected. The power Allowable Value must be verified periodically to not be bypassed when ≥ 30% RTP. This is performed by a Functional check. If any RBM bypass setpoint is non-conservative, then the affected RBM channel is

(continued)

New Insert ARTS - B4:

Simulated Thermal

control rod block

The RBM setpoints are automatically varied as a function of power. Three Allowable Values are specified in Table 3.3.2.1-1, each within a specific power range. The power at which the control rod block Allowable Values automatically change are based on the APRM signal's input to each RBM channel. Below the minimum power setpoint, the RBM is automatically bypassed. These ~~power Allowable Values~~ must be verified periodically to be less than or equal to the specified values. If any power range setpoint is nonconservative, then the affected RBM channel is considered inoperable. ~~Alternatively, the power range channel can be placed in the conservative condition (i.e., enabling the proper RBM setpoint). 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 3.3.1.1.3 and SR 3.3.1.1.8. The 24 month Frequency is based on the actual trip setpoint methodology utilized for these channels.

control rod block NTSPs

Allowable values.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.1.6 (continued)

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 portions of 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.

SR 3.3.2.1.7

CHANNEL CALIBRATION is a test that verifies the channel responds to the measured parameter with the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibration 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 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

Insert TSTF-B3

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.

(continued)

Insert TSTF-B3

SR 3.3.2.1.7 for the RBM Functions is modified by two Notes as identified in Table 3.3.2.1-1. The RBM Functions are Functions that are LSSSs for reactor core Safety Limits. The first Note requires evaluation of channel performance for the condition where the as-found setting for the channel setpoint is not the NTSP but is conservative with respect to the Allowable Value. For digital channel components, no as-found tolerance or as-left tolerance can be specified. Evaluation of instrument performance will verify that the instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. These channels will also be identified in the Corrective Action Program. Entry into the Corrective Action Program will ensure required review and documentation of the condition for continued OPERABILITY. The second Note requires that the as-left setting for the instrument be returned to the NTSP. If the as-left instrument setting cannot be returned to the NTSP, then the instrument channel shall be declared inoperable. The second note also requires that NTSP methodology to be contained in a document controlled by 10 CFR 50.59.

are

the NTSP and

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.1.4 (continued)

DELETE

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considered inoperable. Alternatively, the RBM channel can be placed in the conservative condition (i.e., enabling the RBM trip). 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 need to perform the surveillance during a plant start-up.

SR 3.3.2.1.5

The RWM is automatically bypassed when power is above a specified value. The power level is determined from steam flow signals. The automatic bypass setpoint must be verified periodically to be not bypassed ≤ 10% RTP. This is performed by a Functional check. 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 need to perform the Surveillance during a plant start-up.

SR 3.3.2.1.6

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

(continued)

BASES (continued)

REFERENCES

1. FSAR, Section 7.7.1.2.8.
2. FSAR, Section 7.6.1.a.5.7
3. NEDE-24011-P-A-9-US, "General Electrical Standard Application for Reload Fuel," Supplement for United States, Section S 2.2.3.1, September 1988.
4. "Modifications to the Requirements for Control Rod Drop Accident Mitigating Systems," BWR Owners' Group, July 1986.
5. NEDO-21231, "Banked Position Withdrawal Sequence," January 1977.
6. 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.
7. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 32193)
8. NEDC-30851-P-A, "Technical Specification Improvement Analysis for BWR Control Rod Block Instrumentation," October 1988.
9. GENE-770-06-1, "Addendum to Bases for changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation, Technical Specifications," February 1991.
10. FSAR, Section 15.4.2.
11. NEDO 33091-A, Revision 2, "Improved BPWS Control Rod Insertion Process," April 2003.

INSERT B17

P

INSERT ARTS B4A

A

INSERT B17: P

12. NEDC-32410P-A, "Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC PRNM) Retrofit Plus Option III Stability Trip Function," October 1995.

13. NEDC-32410P-A Supplement 1, "Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC PRNM) Retrofit Plus Option III Stability Trip Function," November 1997.

Insert ARTS B4A A

14. XN-NF-80-19(P)(A) Volume 4 Revision 1, "Exxon Nuclear Methodology for Boiling Water Reactors: Application of the ENC Methodology to BWR Reloads," Exxon Nuclear Company, June 1986.

Technical Specifications Bases Changes
For Information
Unit 2
(Mark-up)

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.

INSERT TSTF-B1

The purpose of the RBM is to limit control rod withdrawal if localized neutron flux exceeds a predetermined setpoint during control rod manipulations. It is assumed to function to block further control rod withdrawal to preclude a MCPR Safety Limit 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 low power range setpoint. 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 at various core heights surrounding the control rod being withdrawn. ~~A signal from one average power range monitor (APRM) channel assigned to each Reactor Protection System (RPS) trip system supplies a reference signal for the RBM channel in the same trip system.~~ ~~This reference signal is used to enable the RBM. If the APRM is indicating less than the low power range setpoint, the RBM is automatically bypassed.~~ The RBM is also automatically bypassed if a peripheral control rod is selected (Ref. 2).

INSERT ARTS B1

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Insert B1b

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new ¶

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The purpose of the RWM is to control rod patterns during startup, 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. Prescribed control rod sequences are stored in the RWM, which will initiate control rod withdrawal and

(continued)

Insert TSTF-B1

The Nominal Trip Setpoint (NTSP) is a predetermined setting for a protective device chosen to ensure automatic actuation prior to the process variable reaching the Analytical Limit and thus ensuring that the Safety Limit (SL) would not be exceeded. The NTSP accounts for various uncertainties. As such, the NTSP meets the definition of a Limiting Safety System Setting (LSSS). If the setting of the protective instrument channel does not protect a reactor core or RCS pressure boundary Safety Limit, the NTSP is not an LSSS. Rod Block Monitor functions 1a,1b and 1c are LSSSs.

Technical Specifications contain values related to the OPERABILITY of equipment required for safe operation of the facility. OPERABLE is defined in Technical Specifications as "...being capable of performing its safety function(s)." For automatic protective devices, the required safety function is to ensure that a SL is not exceeded and therefore the NTSP is the LSSS, as defined by 10 CFR 50.36. However, use of the NTSP to define OPERABILITY in Technical Specifications would be an overly restrictive requirement if it were applied as an OPERABILITY limit for the "as-found" value during a Surveillance. This would result in Technical Specification compliance problems, as well as reports and corrective actions required by the rule which are not necessary to ensure safety.

Use of the NTSP to define "as-found" OPERABILITY under the expected circumstances described above would result in actions required by both the rule and Technical Specifications that are not warranted. However, there is also some point beyond which the device would have not been able to perform its function due, for example, to greater than expected drift. This value needs to be specified in the Technical Specifications in order to define OPERABILITY of the devices and is designated as the Allowable Value which, is the least conservative value of the as-found setpoint that a channel can have during testing.

The Allowable Value specified in SR 3.3.2.1.7 is the least conservative value of the as-found setpoint that a channel can have when tested, such that a channel is OPERABLE if the setpoint is found conservative with respect to the Allowable Value during the CHANNEL CALIBRATION.

INSERT B16: P

An APRM flux signal from one of the four redundant average power range monitor (APRM) channels supplies a reference signal for one of the RBM channels and an APRM flux signal from another of the APRM channels supplies the reference signal to the second RBM channel.

DELETE

A

INSERT ARTS B1: A

A simulated thermal power signal from one of the four redundant average power range monitor (APRM) channels supplies a reference signal for one of the RBM channels and a simulated thermal power signal from another of the APRM channels supplies the reference signal to the second RBM channel. This reference signal is used to determine which RBM range setpoint (low, intermediate, or high) is enabled. If the APRM simulated thermal power is

BASES (continued)

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

INSERT ARTS B1A

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DELETE

1. Rod Block Monitor

The RBM is designed to limit control rod withdrawal if localized neutron flux exceeds a predetermined setpoint. The RBM was originally designed to prevent fuel damage during a Rod Withdrawal Error (RWE) event while operating in the power range in a normal mode of operation. FSAR 15.4.2 (Ref. 10) (Rod Withdrawal Error - At Power) originally took credit for the RBM automatically actuating to stop control rod motion and preventing fuel damage during an RWE event at power. However, current reload analyses do not take credit for the RBM system. The Allowable Values are chosen as a function of power level to not exceed the APRM scram setpoints.

The RBM function satisfies Criterion ~~4~~ 3 of the NRC Policy Statement (Ref. 7).

Two channels of the RBM are required to be OPERABLE, with their setpoints within the appropriate Allowable Value for the associated power range, to ensure that no single instrument failure can preclude a rod block for this Function. The actual setpoints are calibrated consistent with applicable setpoint methodology.

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INSERT ARTS B2

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DELETE

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. The Allowable Values are derived from the analytic limits, corrected for calibration, process, and some of the instrument errors. The trip setpoints are then determined accounting for the remaining instrument errors (e.g., drift). The trip setpoints derived in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, instrument drift, and severe environment errors (for channels that must function in harsh environments as defined by 10 CFR 50.49) are accounted for.

(continued)

Insert TSTF-B2

Allowable Values are specified for each applicable Rod Block Function listed in Table 3.3.2.1-1. The NTSPs are selected to ensure that the actual setpoints are conservative with respect to the Allowable Value. A channel is inoperable if its actual trip setpoint is non-conservative with respect to its required Allowable Value.

NTSPs 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 Analytical Limits are derived from the limiting values of the process parameters obtained from the safety analysis. The Allowable Values are derived from the Analytical Limits, corrected for calibration, process, and some of the instrument errors. The NTSPs are then determined, accounting for the remaining channel uncertainties. The trip setpoints derived in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, and drift are accounted for.

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

Insert ARTS B1A —— A

~~The RBM is designed to limit control rod withdrawal if localized neutron flux exceeds a predetermined setpoint~~. The analytical methods and assumptions used in evaluating the RWE event are summarized in Reference 14. The fuel thermal performance as a function of RBM Allowable Value is determined from the analysis. The Allowable Values are chosen as a function of power level. Based on the specified Allowable Values, operating limits are established.

The RBM is designed to prevent violation of the MCPR SL and the cladding 1% strain fuel design limit that may result from a single control rod withdrawal (RWE) event.

TS Bases Insert ARTS B2 (Revised)

Trip setpoints are those predetermined values of output at which an action should take place. The trip setpoints are compared to the actual process parameter, the calculated RBM flux (RBM channel signal). When the normalized RBM flux value exceeds the applicable trip setpoint, the RBM provides a trip output.

The analytic limits are derived from the limiting values of the process parameters. Using the GE setpoint methodology, based on ISA RP 67.04, Part II " Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation" setpoint calculation Method 2, the RBM Allowable Values are determined from the analytical limits using the statistical combination of the RBM input signal calibration error, process measurement error, primary element accuracy and instrument accuracy under trip conditions. Accounting for these errors assures that a setpoint found during calibration at the Allowable Value has adequate margin to protect the analytical limit thereby protecting the Safety Limit.

For the digital RBM, there is a normalization process initiated upon rod selection, so that only RBM input signal drift over the interval from the rod selection to rod movement needs to be considered in determining the nominal trip setpoints. The RBM has no drift characteristic with no as-left or as-found tolerances since it only performs digital calculations on the digitized input signals provided by the APRMs.

~~The Allowable Value is the Limiting Safety System Setting since the RBM has no drift characteristic~~. The RBM Allowable Value demonstrates that the analytic limit would not be exceeded, thereby protecting the safety limit. The trip setpoints and Allowable Values determined in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, instrument drift, and environment errors are accounted for and appropriately applied for the RBM. There are no margins applied to the RBM nominal trip setpoint calculations which could mask RBM degradation.

or equal to 28 — A

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

The RBM will function when operating greater than ~~30%~~ 28% RTP. Below this power level, the RBM is not required to be OPERABLE.

INSERT ARTS B3

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2. Rod Worth Minimizer

The RWM enforces the banked position withdrawal sequence (BPWS) 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 2, 3, 4, and 5. The BPWS 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 BPWS are specified in LCO 3.1.6, "Rod Pattern Control."

When performing a shutdown of the plant, an optional BPWS control rod sequence (Ref. 7) may be used if the coupling of each withdrawn control rod has been confirmed. The rods may be inserted without the need to stop at intermediate positions. When using the Reference 11 control rod insertion sequence for shutdown, the rod worth minimizer may be reprogrammed to enforce the requirements of the improved BPWS control rod insertion, or may be bypassed and the improved BPWS shutdown sequence implemented under the controls in Condition D.

The RWM Function satisfies Criterion 3 of the NRC Policy Statement. (Ref. 7)

Since the RWM is designed to act as a backup to operator control of the rod sequences, only one channel of the RWM is available and required to be OPERABLE (Ref. 6). 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 BPWS. 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.

(continued)

TECH SPEC BASES MARKUP

INSERT ARTS B3:

The RBM selects one of three different RBM flux trip setpoints to be applied based on the current value of THERMAL POWER. THERMAL POWER is indicated to each RBM channel by a simulated thermal power (STP) reference signal input from an associated reference APRM channel. The OPERABLE range is divided into three "power ranges," a "low power range," an "intermediate power range," and a "high power range." The RBM flux trip setpoint applied within each of these three power ranges is, respectively, the "low trip setpoint," the "intermediate trip setpoint," and the "high trip setpoint" (Allowable Values for which are defined in the COLR). To determine the current power range, each RBM channel compares its current STP input value to three power setpoints, the "low power setpoint",(28%), the "intermediate power setpoint" (current value defined in the COLR), and the "high power setpoint" (current value defined in the COLR), which define, respectively, the lower limit of the low power range, the lower limit of the intermediate power range, and the lower limit of the high power range. The trip setpoint applicable for each power range is more restrictive than the corresponding setpoint for the lower power range(s). When STP is below the low power setpoint, the RBM flux trip outputs are automatically bypassed but the low trip setpoint continues to be applied to indicate the RBM flux setpoint on the NUMAC RBM displays.

The calculated (required) setpoints and applicable power ranges are bounding values. In the equipment implementation, it is necessary to apply a "deadband" to each setpoint. The deadband is applied to the RBM trip setpoint selection logic and the RBM trip automatic bypass logic such that the setpoint being applied is always equal to or more conservative than the required setpoint. Since the RBM flux trip setpoint applicable to the higher power ranges are more conservative than the corresponding trip setpoints for lower power ranges, the trip setpoint applicable to the higher power range (high power range or intermediate power range) continues to be applied when STP decreases below the lower limit of that range until STP is below the power range setpoint by a value exceeding the deadband. Similarly, when STP decreases below the low power setpoint, the automatic bypass of RBM flux trip outputs will not be applied until STP decreases below the trip setpoint a value exceeding the deadband.

The RBM channel uses THERMAL POWER, as represented by the STP input value from its reference APRM channel, to automatically enable RBM flux trip outputs (remove the automatic bypass) and to select the RBM flux trip setpoint to be applied. However, the RBM Upscale function is only required to be OPERABLE when the MCPR values are less than the values defined in the COLR, depending on the THERMAL POWER level. Therefore, even though the RBM Upscale Function is implemented in each RBM channel as a single trip function with a selected trip setpoint, it is characterized in Table 3.3.2.1-1 as three Functions, the Low Power Range – Upscale Function, the Intermediate Power Range – Upscale Function, and the High Power Range – Upscale Function, to facilitate correct definition of the OPERABILITY requirements for the Functions. Each Function corresponds to one of the RBM power ranges. Due to the deadband effects on the determination of the current power range, the transition between these three Functions will occur at slightly different THERMAL POWER levels for increasing power versus decreasing power. ~~Since the RBM flux trip setpoints applied for the higher power ranges are more conservative, the OPERABILITY requirement for the Low Power Range – Upscale Function is satisfied if the Intermediate Power Range – Upscale Function or the High Power Range – Upscale Function is OPERABLE. Similarly, the OPERABILITY requirement for the Intermediate Power Range – Upscale Function is satisfied if the High Power Range – Upscale Function is OPERABLE.~~

BASES (continued)

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 ~~5 days~~ 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 ~~48 hours~~ 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 48 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.

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 was not performed in the last calendar year, i.e. the last 12 months. 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. A reactor startup with an inoperable RWM is defined as rod withdrawal during startup when the RWM is required to be OPERABLE. 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

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BASES (continued)

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.

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The Surveillances are modified by a 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. 9)~~ (Refs. 9, 12 and 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 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 Multiplexing System input. The Frequency of ~~92~~ 184 days is based on reliability analyses ~~(Ref. 8)~~ (Refs. 8, 12, and 13).

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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 verifying proper indication of the selection error of at least one out-of-sequence control rod. 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 in MODE 2. As noted, 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 for SR 3.3.2.1.2, and entry into MODE 1 when THERMAL POWER is ≤ 10% RTP for SR 3.3.2.1.3, to perform the required Surveillance 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. The Frequencies are based on reliability analysis (Ref. 8).

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BASES

SURVEILLANCE REQUIREMENTS (continued)

INSERT ARTS B4

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DELETE

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SR 3.3.2.1.4

The RBM trips are automatically bypassed when power is below a specified value and a peripheral control rod is not selected. The power Allowable Value must be verified periodically to not be bypassed when ≥ 30% RTP. This is performed by a Functional check. If any RBM bypass setpoint is non-conservative, then the affected RBM channel is considered inoperable. Alternatively, the RBM channel can be placed in the conservative condition (i.e., enabling the RBM trip). 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 need to perform the Surveillance during a plant start-up.

SR 3.3.2.1.5

The RWM is automatically bypassed when power is above a specified value. The power level is determined from steam flow signals. The automatic bypass setpoint must be verified periodically to be not bypassed ≤ 10% RTP. This is performed by a Functional check. 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 need to perform the surveillance during a plant start-up.

SR 3.3.2.1.6

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.

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New Insert ARTS - B4:

Simulated Thermal

The RBM setpoints are automatically varied as a function of power. Three Allowable Values are specified in Table 3.3.2.1-1, each within a specific power range. The power at which the control rod block Allowable Values automatically change are based on the APRM signal's input to each RBM channel. Below the minimum power setpoint, the RBM is automatically bypassed. These power Allowable Values must be verified periodically to be less than or equal to the specified values. If any power range setpoint is nonconservative, then the affected RBM channel is considered inoperable. ~~Alternatively, the power range channel can be placed in the conservative condition (i.e., enabling the proper RBM setpoint). 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 3.3.1.1.3 and SR 3.3.1.1.8. The 24 month Frequency is based on the actual trip setpoint methodology utilized for these channels.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.1.6 (continued)

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 portions of 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.

SR 3.3.2.1.7

CHANNEL CALIBRATION is a test that verifies the channel responds to the measured parameter with the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibration 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 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

Insert TSTF-B3

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Insert TSTF-B3

SR 3.3.2.1.7 for the RBM Functions is modified by two Notes as identified in Table 3.3.2.1-1. The RBM Functions are Functions that are LSSSs for reactor core Safety Limits. The first Note requires evaluation of channel performance for the condition where the as-found setting for the channel setpoint is not the NTSP but is conservative with respect to the Allowable Value. For digital channel components, no as-found tolerance or as-left tolerance can be specified. Evaluation of instrument performance will verify that the instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. These channels will also be identified in the Corrective Action Program. Entry into the Corrective Action Program will ensure required review and documentation of the condition for continued OPERABILITY. The second Note requires that the as-left setting for the instrument be returned to the NTSP. If the as-left instrument setting cannot be returned to the NTSP, then the instrument channel shall be declared inoperable. The second note also requires that NTSP methodology to be contained in a document controlled by 10 CFR 50.59.

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the NTSP and

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.

REFERENCES

1. FSAR, Section 7.7.1.2.8.

2. FSAR, Section 7.6.1.a.5.7

3. NEDE-24011-P-A-9-US, "General Electrical Standard Application for Reload Fuel," Supplement for United States, Section S 2.2.3.1, September 1988.

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

5. NEDO-21231, "Banked Position Withdrawal Sequence," January 1977.

6. 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.

7. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 32193)

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

9. GENE-770-06-1, "Addendum to Bases for changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation, Technical Specifications," February 1991.

10. FSAR, Section 15.4.2.

11. NEDO 33091-A, Revision 2, "Improved BPWS Control Rod Insertion Process," April 2003.

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12. NEDC-32410P-A, "Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC PRNM) Retrofit Plus Option III Stability Trip Function," October 1995.

13. NEDC-32410P-A Supplement 1, "Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC PRNM) Retrofit Plus Option III Stability Trip Function," November 1997.

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Insert ARTS B4A

14. XN-NF-80-19(P)(A) Volume 4 Revision 1, "Exxon Nuclear Methodology for Boiling Water Reactors: Application of the ENC Methodology to BWR Reloads," Exxon Nuclear Company, June 1986.