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10 CFR 50.90

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Salem Generating Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-70 and DPR-75
NRC Docket Nos. 50-272 and 50-311

Subject: License Amendment Request to Revise Technical Specifications to Adopt TSTF-547, "Clarification of Rod Position Requirements"

In accordance with the provisions of 10 CFR 50.90, PSEG Nuclear LLC (PSEG) is submitting a request for an amendment to the Technical Specifications (TS) for Salem Generating Station (Salem) Units 1 and 2.

The proposed amendment revises the requirements on control and shutdown rods, and rod and bank position indication. Enclosure 1 provides a description and assessment of the proposed changes. Attachment 1 provides the existing TS pages marked up to show the proposed changes.

PSEG requests approval of the proposed amendment in accordance with the standard NRC approval process and schedule. Once approved, the amendment shall be implemented within 60 days.

In accordance with 10 CFR 50.91, a copy of this application, with attachments, is being provided to the designated State of New Jersey Official.

There are no regulatory commitments contained in this letter.

If you have any questions or require additional information, please contact Mr. Brian Thomas at 856-339-2022.

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

Executed on 2/4/19
(Date)

Respectfully,

Charles V. McFeaters
Site Vice President
Salem Generating Station

Enclosure: Evaluation of the Proposed Changes
Attachment 1 Mark-up of Proposed Technical Specification Pages

cc: Mr. D. Lew, Administrator, Region I, NRC
Mr. J. Kim, Project Manager, NRC
NRC Senior Resident Inspector, Salem
Mr. P. Mulligan, Chief, NJBNE
PSEG Corporate Commitment Tracking Coordinator
Salem Commitment Tracking Coordinator

Enclosure

Evaluation of the Proposed Changes

Table of Contents

DESCRIPTION AND ASSESSMENT

1.0 DESCRIPTION

The proposed amendment revises the requirements on control and shutdown rods, and rod and bank position indication in Salem Technical Specification (TS) 3.1.3.1, "Movable Control Assemblies," Salem TS 3.1.3.4, "Shutdown Rod Insertion Limit," Salem TS 3.1.3.5, "Control Rod Insertion Limits," and Salem TS 3.1.3.2.1, "Position Indication Systems – Operating" to provide time to repair rod movement failures that do not affect rod operability, to provide an alternative to frequent use of the movable incore detector system when position indication for a rod is inoperable, to provide time for analog position indication instruments to read accurately after rod movement, and to correct conflicts between the TS.

2.0 ASSESSMENT

2.1 Applicability of Safety Evaluation

PSEG Nuclear LLC (PSEG) has reviewed the safety evaluation for TSTF-547 provided to the Technical Specifications Task Force in a letter dated March 4, 2016. This review included a review of the NRC staff's evaluation, as well as the information provided in TSTF-547. As described in the subsequent paragraphs, PSEG has concluded that the justifications presented in the TSTF-547 proposal and the safety evaluation prepared by the NRC staff are applicable to Salem Units 1 and 2 and justify this amendment for the incorporation of the changes to the Salem TS.

2.2 Variations

The Salem TS utilize different numbering and titles than the Standard Technical Specifications (NUREG-1431) on which TSTF-547 was based. Specifically,

- NUREG-1431 TS 3.1.4, "Rod Group Alignment Limits" aligns to Salem TS 3.1.3.1, "Movable Control Assemblies"
- NUREG-1431 TS 3.1.5, "Shutdown Bank Insertion Limits" aligns to Salem TS 3.1.3.4, "Shutdown Rod Insertion Limit"
- NUREG-1431 TS 3.1.6, "Control Bank Insertion Limits" aligns to Salem TS 3.1.3.5, "Control Rod Insertion Limits"
- NUREG-1431 TS 3.1.7, "Rod Position Indication" aligns to Salem TS 3.1.3.2.1, "Position Indication Systems – Operating"

The following table provides the comparison of the Salem Unit 1 and 2 TS to the TSTF-547 changes to NUREG-1431:

TSTF-547 Change to NUREG-1431	Equivalent Salem Unit 1 and 2 TS
3.1.4 Required Action B.1	3.1.3.1 Action c.1
3.1.4 Required Actions B.2.4 and B.2.5	3.1.3.1 Action c.3.c
SR 3.1.4.1	SR 4.1.3.1.1
SR 3.1.4.2	SR 4.1.3.1.2
3.1.5 Actions	3.1.3.4 Actions
SR 3.1.5.1	SR 4.1.3.4

3.1.6 Actions	3.1.3.5 Actions
SR 3.1.6.2	SR 4.1.3.5
SR 3.1.6.3	Not in Salem TS
3.1.7 Condition A	3.1.3.2.1 Action a
3.1.7 Condition B	3.1.3.2.1 Action b
3.1.7 Condition C	3.1.3.2.1 Action c
3.1.7 Condition D	3.1.3.2.1 Action d
SR 3.1.7.1	SR 4.1.3.2.1.1

PSEG is proposing the following variations from the TS changes described in TSTF-547 or the applicable parts of the NRC Staff's Safety Evaluation dated March 4, 2016. These differences are administrative and do not affect the applicability of TSTF-547 to the Salem TS.

- NUREG-1431 TS 3.1.4 Required Action B.1 is equivalent to Salem TS 3.1.3.1 Action c.1 with the exception that Salem Action c.1 addresses a single inoperable rod or a single mis-aligned rod. NUREG-1431 TS 3.1.4 Condition A which covers one or more inoperable rods does not have a required action to restore the inoperable rod. Therefore elimination of the Salem TS 3.1.3.1 Action c.1 to restore the inoperable or mis-aligned rod is consistent with TSTF-547 and NUREG-1431.
- NUREG-1431 TS 3.1.4 Required Actions B.2.4 and B.2.5 are combined into new Required Action B.4. New Required Action B.4 is equivalent to the Salem TS 3.1.3.1 Action c.3.c. An editorial change is being made to Salem Unit 1 TS 3.1.3.1 Action c.3.c to insert the word 'and' between $F_Q(Z)$ and $F^N_{\Delta H}$ to make consistent with the Salem Unit 2 TS 3.1.3.1 Action c.3.c.
- NUREG-1431 SR 3.1.4.1 adds two new notes. The allowance of Note 2 is already contained in Salem SR 4.1.3.1.1 and will remain unchanged. Note 1 is added as footnote * to SR 4.1.3.1.1.
- NUREG-1431 TS 3.1.5 new Condition A is incorporated into Salem TS 3.1.3.4 as new Action 1 and the existing action is numbered as 2. The insertion limits for the Salem shutdown banks in TS 3.1.3.4 are referenced to Salem TS definition 1.13a FULLY WITHDRAWN instead of the COLR. New Required Action A.2.1 refers to the shutdown margin (SDM) limits being in the COLR whereas the Salem SDM limits are contained in Salem TS 3.1.1.1. The existing Salem TS actions direct the operators to determine the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied, this language will be used in new Action 1 to be consistent with the existing Salem TS versus the TSTF-547 wording of "Verify SDM is within the limits…." New Required Action A.2.2 to initiate boration to restore SDM within limits is implemented by applying the action of Salem TS 3.1.1.1. The existing plant shutdown requirement in STS 3.1.5 Condition C is incorporated into new Salem Action 1 to align with the current format of the Salem TS.
- NUREG-1431 TS 3.1.6 new Condition A is incorporated into Salem TS 3.1.3.5 as new Action 1 and the existing action is numbered as 2. Salem TS 3.1.3.5 only has requirements for insertion limits; therefore new Action 1 does not contain sequence or overlap limits. New Required Action A.1 refers to the shutdown bank insertion limits being in the COLR; the insertion limits for the Salem shutdown banks in TS 3.1.3.4 are referenced to Salem TS definition 1.13a FULLY WITHDRAWN. New Required Action A.2.1 refers to SDM limits being in the COLR whereas the Salem SDM limits are contained in Salem TS 3.1.1.1. The existing Salem TS actions direct the operators to determine the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied, this language will be used in new Action 1 to be consistent with the existing Salem TS versus the TSTF-547 wording of "Verify SDM is within the limits…." New Required

Action A.2.2 to initiate boration to restore SDM within limits is implemented by applying the action of Salem TS 3.1.1.1. The existing plant shutdown requirement in NUREG-1431 TS 3.1.6 Condition C is incorporated into new Salem action 1 to align with the current format of the Salem TS. Salem TS 3.1.3.5 only has requirements for insertion limits and therefore does not have a separate surveillance for sequence and overlap limits.

- NUREG-1431 TS 3.1.7 new Required Action A.2 is incorporated into Salem TS 3.1.3.2.1 Action a.2. Existing Salem TS 3.1.3.2.1 Action a.2 is renumbered Action a.3. New Salem TS 3.1.3.2.1 Action a.2 will use the terminology 'non-indicating rod(s)' instead of ''inoperable [D]RPI" contained in TSTF-547 to remain consistent with the language in existing Salem TS 3.1.3.2.1 Action a.1. NUREG-1431 TS 3.1.7 new Required Action a.2 is modified to allow use of the movable incore detectors or the power distribution monitoring system (PDMS). The proposed change deviates from TSTF-547 in retaining the current allowance in the Salem TS to use the PDMS (TS 3.3.3.14) as an alternative to the movable incore detectors for indirectly verifying rod position. The NRC approved use of the PDMS (BEACON system) to determine the position of non-indicating rods in Salem Unit 1 and Unit 2 TS Amendments 237 and 218, respectively. Due to the format of the Salem TS, the unnecessary (redundant) NUREG-1431 TS 3.1.7 Required Action B.3 contained as Salem TS 3.1.3.2.1 Action b.3 will not be deleted. The editorial changes of NUREG-1431 Condition A, Required Action A.1, Condition B, Required Action B.4, Condition C, Required Action C.1 and Condition D are not incorporated due to the format of the Salem TS. The note for NUREG-1431 SR 3.1.7.1 is added as footnote * to SR 4.1.3.2.1.1.
- Salem proposes to not include the new Required Action A.2.2 to Technical Specification 3.1.7, "Rod Position Indication." Required Action A.2.2 states, "Restore inoperable [D]RPI to OPERABLE status," with a Completion Time of "Prior to entering MODE 2 from MODE 3." This required Action was included in TSTF-547 in error. Because Required Actions A.1 and A.3 permit continued operation in the Applicability of TS 3.1.7 for an unlimited period of time, LCO 3.0.4.a may be used to enter Mode 2 from Mode 3. As Required Actions A.1, A.2, and A.3 are joined by a logical OR, a licensee may choose to follow Required Action A.2 (which includes A.2.1 and A.2.2) after entering Mode 2. TSTF-547 did not add a Note requiring the Action to be followed as an "otherwise stated" allowance in LCO 3.0.2, so Required Action A.2.2 does not apply in Mode 3 and is not restrictive after Mode 2 is entered. For all these reasons, Required Action A.2.2 is moot. Further, the requirement is not needed to protect plant safety. The staff's Safety Evaluation for TSTF-547 noted that the monitoring method in Required Action A.2.1 is more appropriate than the existing method in Required Action A.1. Therefore, its use should not be restricted. This variation has been previously approved in Watts Bar Amendments 120/20 (ADAMS Accession No. ML18079A029) and Braidwood/Byron Amendments 196/202 (ADAMS Accession No. ML18065A529).
- Based on the content of the Salem TS Bases, none of the identified NUREG-1431 bases changes in TSTF-547 are applicable to the Salem TS Bases.
- Finally the Model Application contained in TSTF-547 contains the final, "camera ready", version of the revised TS change along with a markup of the affected TS. PSEG has elected to withhold this final version of the TS pages to avoid any potential implementation conflicts.

The Traveler and safety evaluation discuss the applicable regulatory requirements and guidance, including the 10 CFR 50, Appendix A, General Design Criteria (GDC). Salem was not licensed to the 10 CFR 50, Appendix A, GDC. Salem was designed and constructed in

accordance with Atomic Energy Commission (AEC) proposed General Design Criteria published in July 1967. The applicable AEC proposed criteria, as document in Salem UFSAR Section 3.1, were compared to 10 CFR 50 Appendix A General Design Criteria (GDC) as discussed below. The applicable GDC criteria are GDC 13, 26, and 28.

Criterion 13—Instrumentation and control. Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges.

GDC Criterion 13 is similar to AEC Criterion 12.

Criterion 26—Reactivity control system redundancy and capability. Two independent reactivity control systems of different design principles shall be provided. One of the systems shall use control rods, preferably including a positive means for inserting the rods, and shall be capable of reliably controlling reactivity changes to assure that under conditions of normal operation, including anticipated operational occurrences, and with appropriate margin for malfunctions such as stuck rods, specified acceptable fuel design limits are not exceeded. The second reactivity control system shall be capable of reliably controlling the rate of reactivity changes resulting from planned, normal power changes (including xenon burnout) to assure acceptable fuel design limits are not exceeded. One of the systems shall be capable of holding the reactor core subcritical under cold conditions.

GDC Criterion 26 is similar to AEC Criterion 27, 28, 29, 30 and 31.

Criterion 28—Reactivity limits. The reactivity control systems shall be designed with appropriate limits on the potential amount and rate of reactivity increase to assure that the effects of postulated reactivity accidents can neither (1) result in damage to the reactor coolant pressure boundary greater than limited local yielding nor (2) sufficiently disturb the core, its support structures or other reactor pressure vessel internals to impair significantly the capability to cool the core. These postulated reactivity accidents shall include consideration of rod ejection (unless prevented by positive means), rod dropout, steam line rupture, changes in reactor coolant temperature and pressure, and cold water addition.

GDC Criterion 28 is similar to AEC Criterion 32.

This difference does not alter the conclusion that the proposed change is applicable to Salem.

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Consideration Analysis

PSEG requests adoption of TSTF-547, "Clarification of Rod Position Requirements," which is an approved change to the Standard Technical Specifications, into the Salem Unit 1 and 2 Technical Specifications (TS). The proposed change revises the requirements on control and shutdown rods, and rod and bank position indication to provide time to repair rod movement failures that do not affect rod operability, to provide an alternative to frequent use of the

movable incore detector system when position indication for a rod is inoperable, to provide time for analog position indication instruments to read accurately after rod movement, and to correct conflicts between the TS.

PSEG has evaluated whether or not a significant hazards consideration is involved with the proposed amendments by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No

   Control and shutdown rods are assumed to insert into the core to shut down the reactor in evaluated accidents. Rod insertion limits ensure that adequate negative reactivity is available to provide the assumed shutdown margin (SDM). Rod alignment and overlap limits maintain an appropriate power distribution and reactivity insertion profile.

   Control and shutdown rods are initiators to several accidents previously evaluated, such as rod ejection. The proposed change does not change the limiting conditions for operation for the rods or make any technical changes to the Surveillance Requirements (SRs) governing the rods. Therefore, the proposed change has no significant effect on the probability of any accident previously evaluated.

   Revising the TS Actions to provide a limited time to repair rod movement control has no effect on the SDM assumed in the accident analysis as the proposed Actions require verification that SDM is maintained. The effects on power distribution will not cause a significant increase in the consequences of any accident previously evaluated as all TS requirements on power distribution continue to be applicable.

   Revising the TS Actions to provide an alternative to frequent use of the moveable incore detector system to verify the position of rods with inoperable rod position indicators does not change the requirement for the rods to be aligned and within the insertion limits.

   Therefore, the assumptions used in any accidents previously evaluated are unchanged and there is no significant increase in the consequences.

   The consequences of an accident that might occur during the 1 hour period provided for the analog rod position indication to stabilize after rod movement are no different than the consequences of the accident under the existing actions with the rod declared inoperable.

   The proposed change to resolve the conflicts in the TS ensure that the intended Actions are followed when equipment is inoperable. Actions taken with inoperable equipment are not assumptions in the accidents previously evaluated and have no significant effect on the consequences.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any previously evaluated?

Response: No

The proposed change does not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed). The change does not alter assumptions made in the safety analyses. The proposed change does not alter the limiting conditions for operation for the rods or make any technical changes to the SRs governing the rods. The proposed change to actions maintains or improves safety when equipment is inoperable and does not introduce new failure modes.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

The proposed change to allow time for rod position indication to stabilize after rod movement and to allow an alternative method of verifying rod position has no effect on the safety margin as actual rod position is not affected. The proposed change to provide time to repair rods that are operable but immovable does not result in a significant reduction in the margin of safety because all rods must be verified to be Operable, and all other banks must be within the insertion limits. The remaining proposed changes to make the requirements internally consistent do not affect the margin of safety as the changes do not affect the ability of the rods to perform their specified safety function.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, PSEG concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

3.2 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

4.0 ENVIRONMENTAL EVALUATION

The proposed change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

Attachment 1

Mark-up of Proposed Technical Specification Pages

The following Technical Specifications pages for Renewed Facility Operating License DPR-70 are affected by this change request:

Technical Specification	Page
3.1.3.1, Movable Control Assemblies Group Height	3/4 1-18, 1-18a
3.1.3.2.1, Position Indication Systems - Operating	3/4 1-19, 1-19a
3.1.3.4, Shutdown Rod Insertion Limit	3/4 1-22
3.1.3.5, Control Rod Insertion Limit	3/4 1-23

The following Technical Specifications pages for Renewed Facility Operating License DPR-75 are affected by this change request:

Technical Specification	Page
3.1.3.1, Movable Control Assemblies Group Height	3/4 1-13, 1-14
3.1.3.2.1, Position Indication Systems - Operating	3/4 1-16, 1-16a
3.1.3.4, Shutdown Rod Insertion Limit	3/4 1-19
3.1.3.5, Control Rod Insertion Limit	3/4 1-20

Technical Specification Mark-Up Inserts for Salem Unit 1 and 2

INSERT #1 (3.1.3.4 Limiting Condition for Operation)

----------Note----------
Not applicable to shutdown banks inserted while performing SR 4.1.3.1.2

INSERT #2 (3.1.3.4 Actions)

1. With one shutdown bank inserted ≤ 10 steps from FULLY WITHDRAWN; within 1 hour verify all control banks are within the insertion limits specified in the COLR and determine the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied; and within 24 hours restore the shutdown bank to FULLY WITHDRAWN or be in HOT STANDBY within the next 6 hours.

INSERT #3 (3.1.3.5 Limiting Condition for Operation)

----------Note----------
Not applicable to control banks inserted while performing SR 4.1.3.1.2

INSERT #4 (3.1.3.5 Actions)

1. With control bank A, B, or C inserted ≤ 10 steps beyond the insertion limits specified in the COLR; within 1 hour verify all shutdown banks are FULLY WITHDRAWN and determine the SHUTDOWN MARGIN requirement of 3.1.1.1 is satisfied; and within 24 hours restore the control bank to within the insertion limits specified in the COLR or be in HOT STANDBY within the next 6 hours.

INSERT #5 (SR 4.1.3.5)

----------Note----------
Not required to be performed until 1 hour after associated rod motion.

INSERT #6 (3.1.3.2.1 Limiting Condition for Operation)

----------Note----------
Individual RPIs are not required to be OPERABLE for 1 hour following movement of the associated rods.

INSERT #7 (3.1.3.2.1 Action a)

2. Verify the position of the non-indicating rod(s) indirectly using the power distribution monitoring system (if power is above 25% RTP) or using the movable incore detectors (if power is less than 25% or the power distribution monitoring system is inoperable) within 8 hours and once per 31 EFPD thereafter, and 8 hours after discovery of each unintended rod movement, and 8 hours after each movement of the non-indicating rod(s) greater than 12 steps, and prior to THERMAL POWER exceeding 50% RTP, and 8 hours after reaching RTP, or

INSERT #8 (SR 4.1.3.2.1.1)

**Not required to be met for RPIs associated with rods that do not meet LCO 3.1.3.1*

FOR INFORMATION ONLY - NO CHANGES

3/4.1 REACTIVITY CONTROL SYSTEMS

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} > 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be ≥ 1.3% Δk/k.

APPLICABILITY: MODES 1, 2*, 3, and 4.

ACTION:

With the SHUTDOWN MARGIN < 1.3% Δk/k, immediately initiate and continue boration at ≥ 33 gpm of a solution containing ≥ 6,560 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be ≥ 1.3% Δk/k:

a. Within one hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable control rod(s).

b. When in MODES 1 or 2#, in accordance with the Surveillance Frequency Control Program by verifying that control banks are within the limits in the COLR per Specification 3.1.3.5.

c. When in MODE 2##, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits in the COLR per specification 3.1.3.5.

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* See Special Test Exception 3.10.1

\# With Keff ≥ 1.0

\## With Keff < 1.0

REACTIVITY CONTROL SYSTEMS

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

3.1.3.1 All full length (shutdown and control) rods, shall be OPERABLE and positioned within ± 18 steps(indicated position) when reactor power is ≤ 85 %, RATED THERMAL POWER, or ± 12 steps (indicated position) when reactor power is > 85% RATED THERMAL POWER, of their group step counter demand position within one hour after rod motion.

APPLICABILITY: MODES 1* and 2*

ACTION:

a. With one or more full length rods inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in HOT STANDBY within 6 hours.

b. With more than one full length rod inoperable or mis-aligned from the group step counter demand position by more than ± 18 steps(indicated position) at ≤ 85 % RATED THERMAL POWER or ± 12 steps (indicated position) at > 85% RATED THERMAL POWER, be in HOT STANDBY within 6 hours.

c. With one full length rod inoperable due to causes other than addressed by ACTION a, above, or mis-aligned from its group step counter demand position by more than ± 18 steps(indicated position) at ≤ 85 % RATED THERMAL POWER or ± 12 steps (indicated position) at > 85% RATED THERMAL POWER, POWER OPERATION may continue provided that within one hour either:

1. ~~The rod is restored to OPERABLE status within the above alignment requirements, or~~ ← Deleted

2. The remainder of the rods in the bank with the inoperable rod are aligned to within ± 18 steps(indicated position) at ≤ 85 % RATED THERMAL POWER or ± 12 steps (indicated position) at > 85% RATED THERMAL POWER of the inoperable rod while maintaining the rod sequence and insertion limits in the COLR per specification 3.1.3.5. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.5 during subsequent operation, or

3. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. POWER OPERATION may then continue provided that:

* See Special Test Exceptions 3.10.2 and 3.10.3.

LIMITING CONDITION FOR OPERATION (Continued)

a) A reevaluation of each accident analysis of table 3.1-1 is performed within 5 days; this reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions.

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours.

and

c) A core power distribution measurement is obtained and $F_Q(Z)$ $F^N_{\Delta H}$ are verified to be within their limits within 72 hours.

d) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within one hour and within the next 4 hours the high neutron flux trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER. THERMAL POWER shall be maintained less than or equal to 75% of RATED THERMAL POWER until compliance with ACTIONS 3.1.3.1.c.3.a and 3.1.3.1.c.3.c above are demonstrated.

SURVEILLANCE REQUIREMENTS *

4.1.3.1.1 The position of each full length rod shall be determined to be within the limits established in the limiting condition for operation in accordance with the Surveillance Frequency Control Program (allowing for one hour thermal soak after rod motion) except during time intervals when the Rod Position Deviation Monitor is inoperable, then verify the group positions at least once per 4 hours.

4.1.3.1.2 Each full length rod not fully inserted in the core shall be determined to be OPERABLE by movement of at least 10 steps in any one direction in accordance with the Surveillance Frequency Control Program.

* Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator.

POSITION INDICATION SYSTEMS - OPERATING (RPI)

LIMITING CONDITION FOR OPERATION

3.1.3.2.1 The shutdown and control rod position indication systems shall be OPERABLE and capable of determining the actual and demanded rod positions as follows:

a. Analog rod position indicators~~, within one hour after rod motion (allowance for thermal soak)~~;

All Shutdown Banks: ± 18 steps at ≤ 85% reactor power or if reactor power is > 85% RATED THERMAL POWER ± 12 steps of the group demand counters for withdrawal ranges of 0-30 steps and 200-230 steps.

Control Bank A: ± 18 steps at ≤ 85% reactor power or if reactor power is > 85% RATED THERMAL POWER ± 12 steps of the group demand counters for withdrawal ranges of 0-30 steps and 200-230 steps.

Control Bank B: ± 18 steps at ≤ 85% reactor power or if reactor power is > 85% RATED THERMAL POWER ± 12 steps of the group demand counters for withdrawal ranges of 0-30 steps and 160-230 steps.

Control Bank C and D: ± 18 steps at ≤ 85% reactor power or if reactor power is > 85% RATED THERMAL POWER ± 12 steps of the group demand counters for withdrawal ranges of 0-230 steps.

Insert #6

b. Group demand counters; ± 2 steps of the pulsed output of the Slave Cycler Circuit over the withdrawal range of 0-230 steps.

APPLICABILITY: MODES 1 and 2.

ACTION:

a. With a maximum of one analog rod position indicator per group inoperable either:

1. Determine the position of the non-indicating rod(s) indirectly using the power distribution monitoring system (if power is above 25% RTP) or using the movable incore detectors (if power is less than 25% RTP or the power distribution monitoring system is inoperable) at least once per 8 hours, or

Insert #7

~~2~~. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

3.

LIMITING CONDITION FOR OPERATION (Continued)

b. With two or more analog rod position indicators per group inoperable:

1. Immediately place the control rods in manual control, and

2. ~~Monitor and record Reactor Coolant System T_{avg} once every hour, and~~ Deleted

3. Verify the position of the rods with inoperable position indicators indirectly using the power distribution monitoring system (if power is above 25% RTP) or using the movable incore detectors (if power is less than 25% RTP or the power distribution monitoring system is inoperable) at least once per 8 hours, and

4. Within 24 hours restore the inoperable rod position indicators to OPERABLE status such that a maximum of one rod position indicator per group is inoperable, or

5. Be in HOT STANDBY within the next 6 hours.

c. When one or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position:

1. Determine the position of the non-indicating rod(s) indirectly using the power distribution monitoring system (if power is above 25% RTP) or using the movable incore detectors (if power is less than 25% RTP or the power distribution monitoring system is inoperable) within 8 hours, or

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

d. With a maximum of one group demand position indicator per bank inoperable either:

1. Verify that all analog rod position indicators for the affected bank are OPERABLE and that the most withdrawn rod and the least withdrawn rod of the bank are within a maximum of 18 steps when reactor power is ≤ 85% RATED THERMAL POWER or if reactor power is > 85% RATED THERMAL POWER, 12 steps of each other at least once per 8 hours, or

2. Reduce THERMAL POWER to less than 50% of RATED POWER within 8 hours.

SURVEILLANCE REQUIREMENTS *

4.1.3.2.1.1 Each analog rod position indicator shall be determined to be OPERABLE by verifying that the demand position indication system and the rod position indication system agree within 18 steps when reactor power is ≤ 85% RATED THERMAL POWER or if reactor power is > 85% RATED THERMAL POWER, 12 steps (allowing for one hour thermal soak after rod motion) in accordance with the Surveillance Frequency Control Program except during time intervals when the Rod Position Deviation Monitor is inoperable, then compare the demand position indication system and the rod position indication system at least once per 4 hours.

4.1.3.2.1.2 Each of the above required rod position indicator(s) shall be determined to be OPERABLE by performance of a CHANNEL calibration in accordance with the Surveillance Frequency Control Program.

Insert #8 →

REACTIVITY CONTROL SYSTEMS

SHUTDOWN ROD INSERTION LIMIT

LIMITING CONDITION FOR OPERATION

Insert #1

3.1.3.4 All shutdown rods shall be FULLY WITHDRAWN.

APPLICABILITY: MODES 1*, and 2*#@

for reasons other than Action 1

Insert #2

ACTION:

2. With a maximum of one shutdown rod not FULLY WITHDRAWN, ~~except for surveillance testing pursuant to Specification 4.1.3.1.2~~, within one hour either:

a. FULLY WITHDRAW the rod, or,

b. Declare the rod to be inoperable and apply Specification 3.1.3.1.

SURVEILLANCE REQUIREMENTS

4.1.3.4 Each shutdown rod shall be determined to be FULLY WITHDRAWN by use of the group demand counters, and verified by the analog rod position indicators**:

a. Within 15 minutes prior to withdrawal of any rods in control banks A, B, C, or D during an approach to reactor criticality, and

b. In accordance with the Surveillance Frequency Control Program thereafter.

Not required to be performed until 1 hour after associated rod motion.

---

* See Special Test Exceptions 3.10.2 and 3.10.3

** ~~For power levels below 50% one hour thermal "soak time" is permitted. During this soak time, the absolute value of rod motion is limited to six steps.~~

With Keff greater than or equal to 1.0

@ Surveillance 4.1.3.4.a is applicable prior to withdrawing control banks in preparation for startup (Mode 2).

REACTIVITY CONTROL SYSTEMS

CONTROL ROD INSERTION LIMITS

LIMITING CONDITION FOR OPERATION

Insert #3

3.1.3.5 The control banks shall be limited in physical insertion as specified in the CORE OPERATING LIMITS REPORT (COLR).

APPLICABILITY: MODES 1*, and 2*#

Insert #4

ACTION:

2. With the control banks inserted beyond the above insertion limits, for reasons other than Action 1 ~~except for surveillance testing pursuant to Specification 4.1.3.1.2~~, either:

a. Restore the control banks to within the limits within two hours, or

b. Reduce THERMAL POWER within two hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the bank position using the insertion limits specified in the COLR, or

c. Be in at least HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

Insert #5

4.1.3.5 The position of each control bank shall be determined to be within the insertion limits in accordance with the Surveillance Frequency Control Program by use of the group demand counters and verified by the analog rod position indicators** except during time intervals when the Rod Insertion Limit Monitor is inoperable, then verify the individual rod positions at least once per 4 hours**.

---

* See Special Test Exceptions 3.10.2 and 3.10.3

~~** For power levels below 50% one hour thermal "soak time" is permitted. During this soak time, the absolute value of rod motion is limited to six steps.~~

\# With K_{eff} greater than or equal to 1.0

3/4.1 REACTIVITY CONTROL SYSTEMS

FOR INFORMATION ONLY - NO CHANGES

3/4.1.1 BORATION CONTROL

SHUTDOWN MARGIN - T_{avg} > 200°F

LIMITING CONDITION FOR OPERATION

3.1.1.1 The SHUTDOWN MARGIN shall be greater than or equal to 1.3% delta k/k.

APPLICABILITY: MODES 1, 2*, 3, and 4.

ACTION:

With the SHUTDOWN MARGIN less than 1.3% delta k/k, immediately initiate and continue boration at ≥ 33 gpm of a solution containing ≥ 6,560 ppm boron or equivalent until the required SHUTDOWN MARGIN is restored.

SURVEILLANCE REQUIREMENTS

4.1.1.1.1 The SHUTDOWN MARGIN shall be determined to be greater than or equal to 1.3% delta k/k:

a. Within 1 hour after detection of an inoperable control rod(s) and at least once per 12 hours thereafter while the rod(s) is inoperable. If the inoperable control rod is immovable or untrippable, the above required SHUTDOWN MARGIN shall be increased by an amount at least equal to the withdrawn worth of the immovable or untrippable control rod(s).

b. When in MODE 1 or MODE 2 with K_{eff} greater than or equal to 1.0, in accordance with the Surveillance Frequency Control Program by verifying that control banks are within the limits in the COLR per Specification 3.1.3.5.

c. When in MODE 2 with K_{eff} less than 1.0, within 4 hours prior to achieving reactor criticality by verifying that the predicted critical control rod position is within the limits in the COLR per Specification 3.1.3.5.

*See Special Test Exception 3.10.1

REACTIVITY CONTROL SYSTEMS
3/4.1.3 MOVABLE CONTROL ASSEMBLIES
GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

3.1.3.1 All full length (shutdown and control) rods, shall be OPERABLE and positioned within ± 18 steps (indicated position) when reactor power is ≤ 85% RATED THERMAL POWER, or ± 12 steps (indicated position) when reactor power is > 85% RATED THERMAL POWER, of their group step counter demand position within one hour after rod motion.

APPLICABILITY: MODES 1* and 2*

ACTION:

a. With one or more full length rods inoperable due to being immovable as a result of excessive friction or mechanical interference or known to be untrippable, determine that the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied within 1 hour and be in HOT STANDBY within 6 hours.

b. With more than one full length rod inoperable or mis-aligned from the group step counter demand position by more than ± 18 steps (indicated position) at ≤ 85% RATED THERMAL POWER or ± 12 steps (indicated position) at > 85% RATED THERMAL POWER, be in HOT STANDBY within 6 hours.

c. With one full length rod inoperable due to causes other than addressed by ACTION a, above, or mis-aligned from its group step counter demand position by more than ± 18 steps (indicated position) at ≤ 85% RATED THERMAL POWER or ± 12 steps (indicated position) at > 85% RATED THERMAL POWER, POWER OPERATION may continue provided that within one hour either:

1. ~~The rod is restored to OPERABLE status within the above alignment requirements, or~~ ← Deleted

2. The remainder of the rods in the bank with the inoperable rod are aligned to within ± 18 steps (indicated position) at ≤ 85% RATED THERMAL POWER or ± 12 steps (indicated position) at >85% RATED THERMAL POWER, of the inoperable rod while maintaining the rod sequence and insertion limits in the COLR per Specification 3.1.3.5. The THERMAL POWER level shall be restricted pursuant to Specification 3.1.3.5 during subsequent operation, or

3. The rod is declared inoperable and the SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is satisfied. POWER OPERATION may then continue provided that:

*See Special Test Exceptions 3.10.2 and 3.10.3.

LIMITING CONDITION FOR OPERATION (Continued)

a) A reevaluation of each accident analysis of Table 3.1-1 is performed within 5 days; this reevaluation shall confirm that the previously analyzed results of these accidents remain valid for the duration of operation under these conditions.

b) The SHUTDOWN MARGIN requirement of Specification 3.1.1.1 is determined at least once per 12 hours.

c) A core power distribution measurement is obtained and $F_Q(Z)$ and $F^N_{\Delta H}$ are verified to be within their limits within 72 hours.

d) The THERMAL POWER level is reduced to less than or equal to 75% of RATED THERMAL POWER within one hour and within the next 4 hours the high neutron flux trip setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER. THERMAL POWER shall be maintained less than or equal to 75% of RATED THERMAL POWER until compliance with ACTIONS 3.1.3.1.c.3.a and 3.1.3.1.c.3.c above are demonstrated.

SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The position of each full length rod shall be determined to be within the limits established in the limiting condition for operation in accordance with the Surveillance Frequency Control Program (allowing for one hour thermal soak after rod motion) except during time intervals when the Rod Position Deviation Monitor is inoperable, then verify the group positions at least once per 4 hours.

4.1.3.1.2 Each full length rod not fully inserted in the core shall be determined to be OPERABLE by movement of at least 10 steps in any one direction in accordance with the Surveillance Frequency Control Program.

* Not required to be performed for rods associated with inoperable rod position indicator or demand position indicator.

REACTIVITY CONTROL SYSTEMS

POSITION INDICATION SYSTEMS - OPERATING

(RPI)

LIMITING CONDITION FOR OPERATION

3.1.3.2.1 The shutdown and control rod position indication systems shall be OPERABLE and capable of determining the actual and demanded rod positions as follows:

a. Analog rod position indicators~~, within one hour after rod motion (allowance for thermal soak)~~;

All Shutdown Banks: ± 18 steps at ≤ 85% reactor power or if reactor power is > 85% RATED THERMAL POWER ± 12 steps of the group demand counters for withdrawal ranges of 0-30 steps and 200-230 steps.

Control Bank A: ± 18 steps at ≤ 85% reactor power or if reactor power is > 85% RATED THERMAL POWER ± 12 steps of the group demand counters for withdrawal ranges of 0-30 steps and 200-230 steps.

Control Bank B: ± 18 steps at ≤ 85% reactor power or if reactor power is > 85% RATED THERMAL POWER ± 12 steps of the group demand counters for withdrawal ranges of 0-30 steps and 160-230 steps.

Control Banks C and D: ± 18 steps at ≤ 85% reactor power or if reactor power is > 85% RATED THERMAL POWER ± 12 steps of the group demand counters for withdrawal range of 0-230 steps.

Insert #6

b. Group demand counters; ± 2 steps of the pulsed output of the Slave Cycler Circuit over the withdrawal range of 0-230 steps.

APPLICABILITY: MODES 1 and 2.

ACTION:

a. With a maximum of one analog rod position indicator per group inoperable either:

1. Determine the position of the non-indicating rod(s) indirectly using the power distribution monitoring system (if power is above 25% RTP) or using the movable incore detectors (if power is less than 25% RTP or the power distribution monitoring system is inoperable) at least once per 8 hours, or

Insert #7

~~2~~. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

3.

LIMITING CONDITION FOR OPERATION (Continued)

b. With two or more analog rod position indicators per group inoperable:

1. Immediately place the control rods in manual control, and

Deleted

2. ~~Monitor and record Reactor Coolant System T_{avg} once every hour, and~~

3. Verify the position of the rods with inoperable position indicators indirectly using the power distribution monitoring system (if power is above 25% RTP) or using the movable incore detectors (if power is less than 25% RTP or the power distribution monitoring system is inoperable) at least once per 8 hours, and

4. Within 24 hours restore the inoperable rod position indicators to OPERABLE status such that a maximum of one rod position indicator per group is inoperable, or

5. Be in HOT STANDBY within the next 6 hours.

c. When one or more rods with inoperable position indicators have been moved in excess of 24 steps in one direction since the last determination of the rod's position:

1. Determine the position of the non-indicating rod(s) indirectly using the power distribution monitoring system (if power is above 25% RTP) or using the movable incore detectors (if power is less than 25% RTP or the power distribution monitoring system is inoperable) within 8 hours, or

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

d. With a maximum of one group demand position indicator per bank inoperable either:

1. Verify that all analog rod position indicators for the affected bank are OPERABLE and that the most withdrawn rod and the least withdrawn rod of the bank are within a maximum of 18 steps when reactor power is ≤ 85% RATED THERMAL POWER or if reactor power is > 85% RATED THERMAL POWER, 12 steps of each other at least once per 8 hours, or

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 8 hours.

SURVEILLANCE REQUIREMENTS *

4.1.3.2.1.1 Each analog rod position indicator shall be determined to be OPERABLE by verifying that the demand position indication system and the rod position indication system agree within 18 steps when reactor power is ≤ 85% RATED THERMAL POWER or if reactor power is > 85% RATED THERMAL POWER, 12 steps (allowing for one hour thermal soak after rod motion) in accordance with the Surveillance Frequency Control Program except during time intervals when the Rod Position Deviation Monitor is inoperable, then compare the demand position indication system and the rod position indication system at least once per 4 hours.

4.1.3.2.1.2 Each of the above required rod position indicator(s) shall be determined to be OPERABLE by performance of a CHANNEL calibration in accordance with the Surveillance Frequency Control Program.

Insert #8

REACTIVITY CONTROL SYSTEMS

SHUTDOWN ROD INSERTION LIMIT

LIMITING CONDITION FOR OPERATION

Insert #1

3.1.3.4 All shutdown rods shall be FULLY WITHDRAWN.

APPLICABILITY: MODES 1*, and 2*#@.

for reasons other than Action 1

Insert #2

ACTION:

2.

With a maximum of one shutdown rod not FULLY WITHDRAWN, ~~except for surveillance testing pursuant to Specification 4.1.3.1.2~~, within one hour either:

a. FULLY WITHDRAW the rod, or,

b. Declare the rod to be inoperable and apply Specification 3.1.3.1.

SURVEILLANCE REQUIREMENTS

4.1.3.4 Each shutdown rod shall be determined to be FULLY WITHDRAWN by use of the group demand counters, and verified by the analog rod position indicators**:

a. Within 15 minutes prior to withdrawal of any rods in control banks A, B, C, and D during an approach to reactor critically, and

b. In accordance with the Surveillance Frequency Control Program thereafter.

Not required to be per ormed until 1 hour a ter associated rod motion.

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* See Special Test Exceptions 3.10.2 and 3.10.3.

** ~~For power levels below 50% one hour thermal "soak time" is permitted. During this soak time, the absolute value of rod motion is limited to six steps.~~

@ Surveillance 4.1.3.4.a is applicable prior to withdrawing any control banks in preparation for startup (Mode 2).

With Keff greater than or equal to 1.0.

Note: This page effective prior to startup from fifth refueling outage scheduled to begin March 1990. Letter dated Jan. 11, 1990.

REACTIVITY CONTROL SYSTEMS

CONTROL ROD INSERTION LIMITS

LIMITING CONDITION FOR OPERATION

3.1.3.5 The control banks shall be limited in physical insertion as specified in the CORE OPERATING LIMITS REPORT (COLR).

Insert #3 →

APPLICABILITY: MODES 1*, and 2*#

for reasons other than Action 1

Insert #4 →

ACTION:

2. With the control banks inserted beyond the above insertion limits, ~~except for surveillance testing pursuant to Specification 4.1.3.1.2~~, either:

a. Restore the control banks to within the limits within two hours, or

b. Reduce THERMAL POWER within two hours to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the bank position using the insertion limits specified in the CLOR, or

c. Be in at least HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

Insert #5 →

4.1.3.5 The position of each control bank shall be determined to be within the insertion limits in accordance with the Surveillance Frequency Control Program by use of the group demand counters and verified by the analog rod position indicators** except during time intervals when the Rod Insertion Limit Monitor is inoperable, then verify the individual rod positions at least once per 4 hours**.

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* See Special Test Exceptions 3.10.2 and 3.10.3

** ~~For power levels below 50% one hour thermal "soak time" is permitted. During this soak time, the absolute value of rod motion is limited to six steps.~~

\# With Keff greater than or equal to 1.0