VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

June 9, 2008

10CFR50.90

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Serial No. 08-0310
SPS/LIC-CGL R0
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
PROPOSED LICENSE AMENDMENT REQUEST
REVISION OF TECHNICAL SPECIFICATION 3.12

Pursuant to 10CFR50.90, Virginia Electric and Power Company (Dominion) requests amendments, in the form of changes to the Technical Specifications (TS) to Facility Operating License Numbers DPR-32 and DPR-37 for Surry Power Station Units 1 and 2, respectively. The proposed change revises action statements in TS 3.12 for insertion limit and shutdown margin requirements, revises the applicability for the operability of the Rod Position Indication and Bank Demand Position Indication Systems, revises/adds action statements for rod position indication, and adds action statements for group step demand counters. These revisions enhance the completeness of the Surry TS and are consistent with NUREG-1431, *Standard Technical Specifications, Westinghouse Plants, Revision 3.0.* Three additional minor changes are proposed to make a terminology correction and to address two minor TS discrepancies introduced by previous license amendments. A related TS 3.12 Basis change reflecting the proposed TS 3.12 revisions is included for the NRC's information. A discussion of the proposed change is provided in Attachment 1. The marked-up and typed proposed TS pages are provided in Attachments 2 and 3, respectively.

We have evaluated the proposed amendment and have determined that it does not involve a significant hazards consideration as defined in 10CFR50.92. The basis for our determination is included in Attachment 1. We have also determined that operation with the proposed change will not result in any significant increase in the amount of effluents that may be released offsite and no significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment is eligible for categorical exclusion from an environmental assessment as set forth in 10CFR51.22(c)(9). Pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed change. The proposed TS change has been reviewed and approved by the Facility Safety Review Committee.

Approval of this proposed TS change is requested by June 30, 2009. Dominion requests a 60-day implementation period following NRC approval of the requested license amendments.

If you have any questions or require additional information, please contact Mr. Gary D. Miller at (804) 273-2771.

Sincerely,

Gerald T. Bischof
Vice President – Nuclear Engineering

Attachments
1. Discussion of Change
2. Proposed Technical Specifications Pages (Mark-Up)
3. Proposed Technical Specifications Pages (Typed)

Commitments made in this letter: None

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Gerald T. Bischof, who is Vice President – Nuclear Engineering, of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 9TH day of June, 2008.

My Commission Expires: May 31, 2010.

VICKI L. HULL
Notary Public
Commonwealth of Virginia
140642
My Commission Expires May 31, 2010

Vicki L. Hull
Notary Public

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ATTACHMENT 1

DISCUSSION OF CHANGE

Virginia Electric and Power Company
(Dominion)
Surry Power Station Units 1 and 2

DISCUSSION OF CHANGE

1. SUMMARY DESCRIPTION

Virginia Electric and Power Company (Dominion) proposes a change to the Surry Power Station Units 1 and 2 Technical Specifications (TS) pursuant to 10 CFR 50.90. The proposed change revises action statements in TS 3.12 for insertion limit and shutdown margin requirements, revises the applicability for the operability of the Rod Position Indication and Bank Demand Position Indication Systems, revises/adds action statements for rod position indication, and adds action statements for group step demand counters. These revisions are consistent with NUREG-1431, *Standard Technical Specifications, Westinghouse Plants, Revision 3.0* (Reference 1). Three additional minor changes are proposed to make a terminology correction and to address two minor TS discrepancies introduced by previous license amendments. A related TS 3.12 Basis change reflecting the proposed TS 3.12 revisions is included for the NRC's information.

The proposed TS change has been reviewed, and it has been determined that no significant hazards consideration exists as defined in 10 CFR 50.92. In addition, it has been determined that the change qualifies for categorical exclusion from an environmental assessment as set forth in 10 CFR 51.22(c)(9); therefore, no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed TS change.

2. DETAILED DESCRIPTION

2.1 Proposed Change

The following specific changes to the Surry Units 1 and 2 TS are proposed:

- TS 3.12.A Control Bank Insertion Limits
  - Revise TS 3.12.A.1 requirements and action statements for the shutdown banks.
  - Revise TS 3.12.A.2 requirements and action statements for the control banks.
- TS 3.12.B Power Distribution Limits
  - Revise TS 3.12.B.6.c to delete the "$\pm$" associated with a reference to 10% QUADRANT POWER TILT.

- TS 3.12.C Control Rod Assemblies

  - Revise TS 3.12.C.3.b.1)(b) to replace the reference to Figure 3.12-1A and Figure 3.12-1B with a reference to the CORE OPERATING LIMITS REPORT.

- TS 3.12.E Rod Position Indication System

  - Revise the title of TS 3.12.E from "Rod Position Indication System" to "Rod Position Indication System and Bank Demand Position Indication System."

  - Revise the applicability of TS 3.12.E.1 for rod position indication and group step demand counter operability to be "from movement of control banks to achieve criticality and with the REACTOR CRITICAL." The revised applicability of TS 3.12.E.1 necessitates revisions in TS 3.12.C for consistency.

  - Revise the existing TS 3.12.E.2.a, TS 3.12.E.2.b, and TS 3.12.E.3 action statements and add actions in TS 3.12.E.4, as well as part of TS 3.12.E.6, for rod position indication inoperability.

  - Add TS 3.12.E.5, as well as part of TS 3.12.E.6, to include action statements for group step demand counter inoperability.

- TS 3.12.G Shutdown Margin

  - Add TS 3.12.G to include shutdown margin requirements and action statement.

- TS 3.12 Basis

  - Revise the Basis for TS 3.12 to reflect the revisions to TS 3.12.E. The TS 3.12 Basis change is included for the NRC's information.

- TS 4.10 Reactivity Anomalies

  - Revise TS 4.10.A to delete the requirement to report the evaluation of the specified boron concentration discrepancy to the Nuclear Regulatory Commission per Section 6.6 of the TS.

3. TECHNICAL EVALUATION

The following discussion provides justification for the proposed changes discussed in Section 2.1 above. The proposed change revises action statements in TS 3.12 for insertion limit and shutdown margin requirements, revises the applicability for the operability of the Rod Position Indication and Bank Demand Position Indication

Systems, revises/adds action statements for rod position indication, and adds action statements for group step demand counters. This change is being made to enhance the completeness of the Surry TS and to achieve consistency with NUREG-1431 for Standard [Improved] Technical Specifications (ITS) with respect to requirements and action statements for insertion limits, shutdown margin (SDM), rod position indication, and group step demand counters. Three additional minor changes are proposed to make a terminology correction and to address two minor TS discrepancies introduced by previous license amendments. A related TS 3.12 Basis change reflecting the proposed TS 3.12 revisions is included for the NRC's information.

TS 3.12.A Control Bank Insertion Limits

The existing requirements in TS 3.12.A.1 specifying that the shutdown control rod assemblies shall be fully withdrawn whenever the reactor is critical are identical to the requirements in the original Surry TS (Reference 2). The existing action statements were added by TS Amendments 189/189 (Reference 3). Consistent with the ITS requirements in Section 3.1.5 of NUREG-1431, the proposed change indicates that the shutdown banks shall be within the insertion limits specified in the CORE OPERATING LIMITS REPORT (COLR) and revises the action statements to be identical to the Required Actions in ITS Section 3.1.5.

The existing requirements and action statements in TS 3.12.A.2 for the control banks whenever the reactor is critical were incorporated into the Surry TS by Amendments 189/189 (Reference 3). Consistent with the ITS requirements in Section 3.1.6 of NUREG-1431 for control bank insertion limits, the proposed change indicates the control banks shall be within the insertion limits specified in the COLR and revises the action statements to be identical to the Required Actions in ITS Section 3.1.6.

TS 3.12.B Power Distribution Limits

Surry Technical Specification Change No. 6 (Reference 4) included TS changes to provide protection against the effects of fuel densification. In TS 3.12.B.2.c (now numbered TS 3.12.B.6.c), the terminology of $\pm$ 10% quadrant (to average) power tilt was introduced. The proposed change deletes the "$\pm$" associated with the reference to 10% QUADRANT POWER TILT (QPT) since a negative tilt cannot exist.

TS 3.12.C Control Rod Assemblies

Surry TS Amendments 189/189 (Reference 3) previously relocated cycle specific parameters contained in the TS to the COLR. TS Figures 3.12-1A and 1B, Control Bank Insertion Limits for Normal 3 Loop Operation," for Units 1 and 2, respectively, should have been deleted by this amendment since Control Bank Insertion Limits were relocated to the COLR. TS Amendments 194/194 (Reference 5) deleted TS Figures 3.12-1A and 1B and also deleted a reference to these Figures in

TS 3.12.A.2 Control Bank Insertion Limits. The reference in TS 3.12.A.2 was changed from "Figures 3.12-1A and 1B" to the "CORE OPERATING LIMITS REPORT" (COLR). However, due to an administrative oversight, an additional TS reference to the deleted TS Figures 3.12-1A and 1B contained in TS 3.12.C.3.b.1)(b) was not identified and revised to reference the COLR. The proposed change corrects this discrepancy.

TS 3.12.E Rod Position Indication System

Control and shutdown rod position accuracy is essential during power operation. Power peaking, ejected rod worth, or shutdown margin limits may be violated in the event of a design basis accident with control or shutdown rods operating outside their limits and being undetected. Therefore, the acceptance criteria for rod position indication is that rod positions must be known with sufficient accuracy to verify the core is operating within the group sequence, overlap, design peaking limits, ejected rod worth and with minimum shutdown margin. The rod positions must also be known to verify the alignment limits are preserved. The axial position of shutdown rods and control rods are determined by two separate and independent systems: the Bank Demand Position Indication System (commonly called the group step demand counters) and the Rod Position Indication System. These two systems provide the control room operators with redundant rod position indication to ensure compliance with the requirements of TS 3.12.E, as well as to ensure that the unit is operating within the bounds of the accident analysis assumptions.

The Bank Demand Position Indication System counts the pulses from the Rod Control System that move the rods. There is one group step demand counter for each group of rods. Individual rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step demand counter for that group. The Bank Demand Position Indication System is considered highly precise ($\pm$ 2 steps).

The Rod Position Indication System provides an accurate indication of actual rod position, but at a lower precision than the group step demand counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube. The Rod Position Indication System is capable of monitoring rod position within at least $\pm$ 12 steps during steady state temperature conditions and within $\pm$ 24 steps during transient temperature conditions. Below 50% RATED POWER, a wider tolerance on indicated rod position for a maximum of one hour in every 24 hours is permitted to allow the system to reach thermal equilibrium. This thermal soak time is available both for a continuous one hour period or several discrete intervals as long as the total time does not exceed 1 hour in any 24 hour period and the indicated rod position does not exceed 24 steps from the group step demand counter position.

The proposed change revises the current TS 3.12 title of "Rod Position Indication System" to "Rod Position Indication System and Bank Demand Position Indication

System" for completeness. This title change is consistent with the statement of ITS LCO 3.1.7 in NUREG-1431.

The current rod position indication and group step demand counter operability requirements contained in TS 3.12.E.1 were incorporated into the Surry TS in Amendments 131/131 (Reference 6). The proposed change revises the applicability of the TS 3.12.E.1 operability requirements to be "from movement of control banks to achieve criticality and with the REACTOR CRITICAL," consistent with the applicability of Modes 1 and 2 in ITS Section 3.1.7 of NUREG-1431. The requirements on rod position indication and the group step demand counters are only applicable at these times, because these are the only conditions in which the rods can affect core power distribution and in which the rods are relied upon to provide required shutdown margin. In the shutdown conditions, the operability of the shutdown banks and control banks has the potential to affect the required shutdown margin, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

TS Amendments 78/79 (Reference 7) revised the TS to limit control rod misalignment to no more than $\pm$ 12 steps indicated position. These amendments included actions in TS 3.12.E.2 and TS 3.12.E.3 fundamentally the same as the current actions; subsequent TS revisions included terminology changes (e.g., RCC vs. control rod assembly and core instrumentation vs. moveable incore detectors). The proposed change revises the existing TS 3.12.E.2.a, TS 3.12.E.2.b, and TS 3.12.E.3 action statements and adds actions in TS 3.12.E.4, as well as part of TS 3.12.E.6, for rod position indication inoperability. In addition, the proposed change adds TS 3.12.E.5, as well as part of TS 3.12.E.6, to include action statements for group step demand counter inoperability. These revisions are consistent with the Required Actions in ITS Section 3.1.7 of NUREG-1431. The various action statement time requirements are based on operating experience and reflect the significance of the circumstances with respect to verification of rod position and potential rod misalignment. Reduction of RATED POWER to less than or equal to 50% puts the core into a condition where rod position is not significantly affecting core peaking factors. Therefore, during operation below 50% of RATED POWER, no special monitoring is required. In the shutdown conditions, the operability of the shutdown banks and control banks has the potential to affect the required shutdown margin, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

A related TS 3.12 Basis change reflecting the proposed TS 3.12 revisions is included for the NRC's information.

TS 3.12.G Shutdown Margin

New requirements are being added to specify that, whenever the reactor is subcritical, the shutdown margin requirements in the COLR shall be satisfied and to require that, if the shutdown margin is not within the specified limits, initiate boration within

15 minutes to restore the shutdown margin to within the specified limits. These requirements are consistent with the ITS requirements in Section 3.1.1 of NUREG 1431.

TS 4.10 Reactivity Anomalies

The existing requirements in TS 4.10.A regarding monthly comparison of actual versus predicted boron concentration and reporting of the evaluation of the specified discrepancy per Section 6.6 of the TS are the same as the requirements in the original Surry TS (Reference 2) with revision of Atomic Energy Commission to Nuclear Regulatory Commission. The original Surry TS 6.6.B.1 required Abnormal Occurrence Reports, one of which defined (at that time) in TS 1.0.I.5 was uncontrolled or unanticipated change in reactivity. Surry TS Amendments 104/104 (Reference 10) included revisions to the notification requirements in the TS to be consistent with 10CFR50.72 and 10CFR50.73. These revisions included 1) replacement of the TS 1.0.I definition for Abnormal Occurrence with the following definition of a Reportable Event (now numbered as TS 1.0.H): "A reportable event shall be any of those conditions specified in Section 50.73 of 10 CFR Part 50." and 2) deletion of the TS 6.6.B requirements for Non-Routine Reports, including TS 6.6.B.1 for Abnormal Occurrence Reports. When TS Amendments 104/104 were implemented deleting the TS 6.6.B requirements, the TS 4.10.A reference to reporting per Specification 6.6 should have also been deleted. The proposed change deletes the phrase "and reported to the Nuclear Regulatory Commission per Section 6.6 of the Specifications" in TS 4.10.A. This deletion is consistent with ITS Section 5.6 Reporting Requirements, which does not include reporting of any discrepancy between the actual versus predicted boron concentration.

4. REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to develop TS, which are included as a part of the operating license (OL). 10CFR50.36, *Technical specifications*, sets forth the content of the TS. This regulation requires the TS to include items in specific categories including, (1) safety limits, limiting safety system settings, and limiting control settings, (2) limiting conditions for operation (LCOs), (3) surveillance requirements, (4) design features, and administrative controls. 10CFR50.36 does not specify the particular specifications to be included as part of a plant's OL. By letter dated May 9, 1988, (Reference 8) the NRC described results of an NRC staff review to determine which LCOs should be included in the TS. This ultimately resulted in four criteria being developed, as described in the "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors," (Reference 9), which were later codified in 10CFR50.36(c)(2)(ii).

Criterion 2 of 10CFR50.36(c)(2)(ii) requires that a TS LCO must be established for "a process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier."

SDM satisfies Criterion 2 of 10CFR50.36(c)(2)(ii). Even though it is not directly observed from the control room, SDM is considered an initial condition process variable because it is periodically monitored to ensure that the unit is operating within the bounds of accident analysis assumptions.

Insertion limits, the rod position indicator channels, and the group step demand counter channels satisfy Criterion 2 of 10CFR50.36(c)(2)(ii).

4.2 Determination of No Significant Hazards Consideration

Virginia Electric and Power Company (Dominion) proposes a change to the Surry Power Station Units 1 and 2 Technical Specifications (TS) pursuant to 10 CFR 50.90. The proposed change revises action statements in TS 3.12 for insertion limit and shutdown margin (SDM) requirements, revises the applicability for the operability of the Rod Position Indication and Bank Demand Position Indication Systems, revises/adds action statements for rod position indication, and adds action statements for group step demand counters. This change is proposed to enhance the completeness of the Surry TS and to achieve consistency with NUREG-1431, *Standard Technical Specifications, Westinghouse Plants, Revision 3.0* (Reference 1), with respect to the requirements and action statements for insertion limits, SDM, rod position indication, and group step demand counters. Three additional minor changes are proposed to make a terminology correction and to address two minor TS discrepancies introduced by previous license amendments.

In accordance with the criteria set forth in 10 CFR 50.92, Dominion has evaluated the proposed TS change and determined that the change does not represent a significant hazards consideration. The following is provided in support of this conclusion:

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

   Response: No.

   The proposed change is being made to enhance the completeness of the Surry TS and to achieve consistency with NUREG-1431 with respect to requirements and action statements for insertion limits, SDM, rod position indication, and group step demand counters. The proposed change does not add or modify any plant systems, structures or components (SSCs). Thus, the proposed change does not affect initiators of analyzed events or assumed mitigation of accident or transient events. Therefore, this change does not

involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No.

The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed). Although the proposed change revises the applicability of the operability requirements for the Rod Position Indication and Bank Demand Position Indication Systems, it does not involve a change in methods governing plant startup, operation, or shutdown. The proposed change does not adversely affect accident initiators or precursors, nor does it alter the design assumptions, conditions, or configuration of the facility. The proposed change does not alter or prevent the ability of SSCs to perform their intended function to mitigate the consequences of an initiating event within the assumed acceptance limits. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does this change involve a significant reduction in a margin of safety?

Response: No.

The proposed change does not result in plant operation in a configuration outside the analyses or design basis, nor does it alter the condition or performance of equipment or systems used in accident mitigation or assumed in any accident analysis. Therefore, the proposed TS change does not involve a significant reduction in a margin of safety.

Based on the above, Dominion concludes that the proposed change presents no significant hazards consideration under the standards set forth in 10CFR50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.3 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 implementation of the proposed TS change, (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.

5. ENVIRONMENTAL CONSIDERATION

The proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10CFR51.22(c)(10) as follows:

(i) The proposed change involves no significant hazards consideration.

As described in Section 4.2 above, the proposed change involves no significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

The proposed change does not involve the installation of any new equipment or the modification of any equipment that may affect the types or amounts of effluents that may be released offsite. Therefore, there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

(iii) There is no significant increase in individual or cumulative occupation radiation exposure.

The proposed change does not involve physical plant changes or introduce any new modes of plant operation. Therefore, there is no significant increase in individual or cumulative occupational radiation exposure.

Based on the above, Dominion concludes that, pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6. REFERENCES

1. NUREG-1431, *Standard Technical Specifications, Westinghouse Plants, Volume 1, Rev. 3.0,* dated June 2004.

2. Original Surry Technical Specifications, dated March 17, 1972.

3. Letter from USNRC to W. L. Stewart, Virginia Electric and Power Company, dated March 2, 1994, "Subject: Surry Units 1 and 2 – Issuance of Amendments Re: Core Operating Limits Report (TAC Nos. M87004 and M87005)."

4. Letter from USNRC to Stanley Ragone, Virginia Electric and Power Company, dated March 30, 1973 – Tech Spec Change No. 6.

5. Letter from USNRC to J. P. O'Hanlon, Virginia Electric and Power Company, dated November 15, 1994, "Subject: Surry Units 1 and 2 – Issuance of Amendments Re: Core Operating Limits Report (COLR) (TAC Nos. M89910 and M89911)."

6. Letter from USNRC to W. R. Cartwright, Virginia Electric and Power Company, dated August 2, 1989, "Subject: Surry Units 1 and 2 – Issuance of Amendments Re: Individual Rod Position Indicating System (TAC Nos. 69106 and 69107)."

7. Letter from USNRC to R. H. Leasburg, Virginia Electric and Power Company, dated June 17, 1982 – Amendment Nos. 78 and 79.

8. Thomas E. Murley, Director, Office of Nuclear Reactor Regulation, US Nuclear Regulatory Commission, letter to Walter S. Wilgus, Chairman, The B&W Owners Group, "NRC Staff Review of Nuclear Steam Supply System Vendor Owners Groups' Application of the Commission's Interim Policy Statement Criteria to Standard Technical Specifications," dated May 9, 1988.

9. US Nuclear Regulatory Commission, "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors" (Final Policy Statement), 58 FR 39132, dated July 22, 1993.

10. Letter from USNRC to W. L. Stewart, Virginia Electric and Power Company, dated December 11, 1985 – Amendment Nos. 104 and 104.

ATTACHMENT 2

PROPOSED TECHNICAL SPECIFICATIONS PAGES (MARK-UP)

Virginia Electric and Power Company
(Dominion)
Surry Power Station Units 1 and 2

3.12 CONTROL ROD ASSEMBLIES AND POWER DISTRIBUTION LIMITS

Applicability

Applies to the operation of the control rod assemblies and power distribution limits.

Objective

To ensure core subcriticality after a reactor trip, a limit on potential reactivity insertions from hypothetical control rod assembly ejection, and an acceptable core power distribution during power operation.

Specification

A. Control Bank Insertion Limits

INSERT A

1. Whenever the reactor is critical, except for physics tests and control rod assembly surveillance testing, ~~the~~ each shutdown control rod assemblies shall be fully withdrawn. With a shutdown control rod assembly not fully withdrawn, within 1 hour either fully withdraw the assembly or declare the assembly inoperable and apply Specification 3.12.C.

2. Whenever the reactor is critical, except for physics tests and control rod assembly surveillance testing, the full length control banks shall be inserted no further than the appropriate limit specified in the CORE OPERATING LIMITS REPORT. With a control bank inserted beyond the limit specified in the CORE OPERATING LIMITS REPORT, restore the control rod assembly bank to within its limits within 2 hours, or reduce THERMAL POWER within 2 hours to less than or equal to that fraction of RATED POWER specified in the CORE OPERATING LIMITS REPORT, or place the reactor in HOT SHUTDOWN within 6 hours.

INSERT B

3. The Control Bank Insertion Limits shown in the CORE OPERATING LIMITS REPORT may be revised on the basis of physics calculations and physics data obtained during unit startup and subsequent operation, in accordance with the following:

INSERT A (in TS 3.12.A.1 on page TS 3.12-1):

bank shall be within the insertion limits specified in the CORE OPERATING LIMITS REPORT. With one or more shutdown banks not within limits:

a. Within 1 hour, verify shutdown margin is within the limits specified in the CORE OPERATING LIMITS REPORT or initiate boration to restore shutdown margin to within limit and

b. Within 2 hours, restore shutdown banks to within limits.

If the above requirements are not met, be in HOT SHUTDOWN within 6 hours.

INSERT B (in TS 3.12.A.2 on page TS 3.12-1):

within the insertion limits specified in the CORE OPERATING LIMITS REPORT. With control bank insertion limits not met:

a. Within 1 hour, verify shutdown margin is within the limits specified in the CORE OPERATING LIMITS REPORT or initiate boration to restore shutdown margin to within limit and

b. Within 2 hours, restore control banks to within limits.

If the above requirements are not met, be in HOT SHUTDOWN within 6 hours.

5. The allowable QUADRANT POWER TILT is 2.0% and is only applicable while operating at THERMAL POWER > 50%.

6. If, except for operation at THERMAL POWER ≤ 50% or for physics and control rod assembly surveillance testing, the QUADRANT POWER TILT exceeds 2%, then:

   a. Within 2 hours, either the hot channel factors shall be determined and the power level adjusted to meet the requirement of Specification 3.12.B.1, or

   b. The power level shall be reduced from RATED POWER 2% for each percent of QUADRANT POWER TILT. The high neutron flux trip setpoint shall be similarly reduced within the following 4 hours.

   c. If the QUADRANT POWER TILT exceeds ~~±~~ 10%, the power level shall be reduced from RATED POWER 2% for each percent of QUADRANT POWER TILT within the next 30 minutes. The high neutron flux trip setpoint shall be similarly reduced within the following 4 hours.

7. If, except for operation at THERMAL POWER ≤ 50% or for physics and control rod assembly surveillance testing, after a further period of 24 hours, the QUADRANT POWER TILT in Specification 3.12.B.5 above is not corrected to less than 2%:

   a. If the design hot channel factors for RATED POWER are not exceeded, an evaluation as to the cause of the discrepancy shall be made and a special report issued to the Nuclear Regulatory Commission.

   b. If the design hot channel factors for RATED POWER are exceeded and the power is greater than 10%, then the high neutron flux, Overpower ΔT and Overtemperature ΔT trip setpoints shall be reduced 1% for each percent the hot channel factor exceeds the RATED POWER design values within the next 4 hours, and the Nuclear Regulatory Commission shall be notified.

c. If the hot channel factors are not determined, then the Overpower ΔT and Overtemperature ΔT trip setpoints shall be reduced by the equivalent of 2% power for every 1% QUADRANT POWER TILT within the next 4 hours, and the Nuclear Regulatory Commission shall be notified.

C. Control Rod Assemblies

1. To be considered OPERABLE during startup and POWER OPERATION each control rod assembly shall:

   1) be trippable,

   2) aligned within ± 12 steps or ~~± 24~~ steps of its group step demand position, ~~during the "Thermal Soak" period,~~ as defined in Section 3.12.E.1.b, ~~or ± 12 steps otherwise during power operation~~, and

   3) have a drop time of less than or equal to 2.4 seconds to dashpot entry.

2. To be considered OPERABLE during shutdown modes, each control rod assembly shall:

   1) be trippable, and

   ~~2) have its rod position indicator capable of verifying rod movement upon demand, and~~

   2) ~~3)~~ have a drop time of less than or equal to 2.4 seconds to dashpot entry.

3. Startup and POWER OPERATION may continue with one control rod assembly inoperable provided that within one hour either:

   a. The control rod assembly is restored to OPERABLE status, as defined in Specification 3.12.C.1 and 2, or

   b. the shutdown margin requirement of Specification 3.12.A.3.c is satisfied. POWER OPERATION may then continue provided that:

      1) either:

(a) power shall be reduced to less than 75% of RATED POWER within one (1) hour, and the High Neutron Flux trip setpoint shall be reduced to less than or equal to 85% of RATED POWER within the next four (4) hours, or

(b) the remainder of the control rod assemblies in the group with the inoperable control rod assembly are aligned to within 12 steps of the inoperable rod within one (1) hour while maintaining the control rod assembly sequence and insertion limits ~~of Figure 3.12-1A and B;~~ the THERMAL POWER level shall be restricted pursuant to Specification 3.12.A during subsequent operation.

Specified in the CORE OPERATING LIMITS REPORT;

2) the shutdown margin requirement of Specification 3.12.A.3.c is determined to be met within one hour and at least once per 12 hours thereafter.

3) the hot channel factors are shown to be within the design limits of Specification 3.12.B.1 within 72 hours. Further, it shall be demonstrated that the value of Fxy(Z) used in the Constant Axial Offset Control analysis is still valid.

4) a reevaluation of each accident analysis of Table 3.12-1 is performed within 5 days. This reevaluation shall confirm that the previous analyzed results of these accidents remain valid for the duration of operation under these conditions.

E. Rod Position Indication System and Bank Demand Position Indication System

1. Rod position indication shall be provided as follows:

From movement of control banks to achieve criticality and with the REACTOR CRITICAL,

a. Above 50% power, the Rod Position Indication System shall be OPERABLE and capable of determining the control rod assembly positions to within ± 12 steps of their respective group step demand counter indications.

b. From movement of control banks to achieve criticality up to 50% power, the Rod Position Indication System shall be OPERABLE and capable of determining the control rod assembly positions to within ± 24 steps of their respective group step demand counter indications for a maximum of one hour out of twenty-four, and to within ± 12 steps otherwise. ~~During the one hour "Thermal Soak" period, the step demand counters shall be OPERABLE and capable of determining the group demand positions to within ± 2 steps.~~

From movement of control banks to achieve criticality and with the REACTOR CRITICAL,

c. ~~In HOT, INTERMEDIATE, and COLD SHUTDOWN, the step demand counters~~ the Bank Demand Position Indication System shall be OPERABLE and capable of determining the group demand positions to within ± 2 steps. ~~The rod position indicators shall be available to verify control rod assembly movement upon demand.~~

2. If ~~a~~ one rod position indicator ~~channel~~ per group for one or more groups is inoperable, ~~then:~~

~~a. For operation above 50% of RATED POWER,~~ the position of the control rod assembly shall be ~~checked~~ verified indirectly using the movable incore detectors at least once per 8 hours and immediately after any motion of the non-indicating control rod assembly exceeding 24 steps. ~~or~~ Alternatively,

~~b.~~ Reduce power to less than 50% of RATED POWER within 8 hours. During operations below 50% of RATED POWER, no special monitoring is required.

INSERT C

3. If more than one rod position indicator channel per group or two rod position indicator channels per bank are inoperable during control bank motion to achieve criticality or POWER OPERATION, then the unit shall be placed in HOT SHUTDOWN within 6 hours.

F. DNB Parameters

1. The following DNB related parameters shall be maintained within their limits during POWER OPERATION:

   - Reactor Coolant System $T_{avg} \leq 577.0°F$
   - Pressurizer Pressure ≥ 2205 psig
   - Reactor Coolant System Total Flow Rate $\geq 273{,}000$ gpm

   a. The Reactor Coolant System T_{avg} and Pressurizer Pressure shall be verified to be within their limits at least once every 12 hours.

   b. The Reactor Coolant System Total Flow Rate shall be determined to be within its limit by measurement at least once per refueling cycle.

2. When any of the parameters in Specification 3.12.F.1 has been determined to exceed its limit, either restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less than 5% of RATED POWER within the next 4 hours.

3. The limit for Pressurizer Pressure in Specification 3.12.F.1 is not applicable during either a THERMAL POWER ramp increase in excess of 5% of RATED POWER per minute or a THERMAL POWER step increase in excess of 10% of RATED POWER.

INSERT D

INSERT C (on page TS 3.12-12):

3. If more than one rod position indicator per group is inoperable, place the control rods under manual control immediately, monitor and record RCS T_{avg} once per hour, verify the position of the control rod assemblies indirectly using the movable incore detectors at least once per 8 hours, and restore inoperable position indicators to OPERABLE status such that a maximum of one position indicator per group is inoperable within 24 hours.

4. If 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, verify the position of the control rod assemblies indirectly using the movable incore detectors within 4 hours or reduce power to less than 50% of RATED POWER within 8 hours.

5. If one group step demand counter per bank for more than one or more banks is inoperable, verify that all rod position indicators for the affected bank(s) are OPERABLE once per 8 hours and verify that the most withdrawn rod and the least withdrawn rod of the affected bank(s) are less than or equal to 12 steps apart once per 8 hours. Alternatively, reduce power to less than 50% of RATED POWER within 8 hours.

6. If the requirements of Specifications 3.12.E.2, 3.12.E.3, 3.12.E.4, or 3.12.E.5 are not satisfied, then the unit shall be placed in HOT SHUTDOWN within 6 hours.

INSERT D (on page TS 3.12-12):

G. Shutdown Margin

1. Whenever the reactor is subcritical, the shutdown margin shall be within the limits specified in the CORE OPERATING LIMITS REPORT. If the shutdown margin is not within limits, within 15 minutes, initiate boration to restore shutdown margin to within limits.

Basis

The reactivity control concept assumed for operation is that reactivity changes accompanying changes in reactor power are compensated by control rod assembly motion. Reactivity changes associated with xenon, samarium, fuel depletion, and large changes in reactor coolant temperature (operating temperature to COLD SHUTDOWN) are compensated for by changes in the soluble boron concentration. During POWER OPERATION, the shutdown control rod assemblies are fully withdrawn and control of power is by the control banks. A reactor trip occurring during POWER OPERATION will place the reactor into HOT SHUTDOWN. The control rod assembly insertion limits provide for achieving HOT SHUTDOWN by reactor trip at any time, assuming the highest worth control rod assembly remains fully withdrawn, with sufficient margins to meet the assumptions used in the accident analysis. In addition, they provide a limit on the maximum inserted control rod assembly worth in the unlikely event of a hypothetical assembly ejection and provide for acceptable nuclear peaking factors. The limit may be determined on the basis of unit startup and operating data to provide a more realistic limit which will allow for more flexibility in unit operation and still assure compliance with the shutdown requirement.

The maximum shutdown margin requirement occurs at end of core life and is based on the value used in the analyses of the hypothetical steam break accident. The control rod assembly insertion limits are based on end of core life conditions. The shutdown margin for the entire cycle length is established at 1.77% reactivity. Other accident analyses with the exception of the Chemical and Volume Control System malfunction analyses are based on 1% reactivity shutdown margin. Relative positions of control banks are determined by a specified control bank overlap. This overlap is based on the consideration of axial power shape control. The specified control rod assembly insertion limits have been established to limit the potential ejected control rod assembly worth in order to account for the effects of fuel densification. The various control rod assemblies (shutdown banks, control banks A, B, C, and D) are each to be moved as a bank; that is, with each assembly in the bank within one step (5/8 inch) of the bank position.

Position indication is provided by two methods: a digital count of actuating pulses which shows the demand position of the banks, and a linear position indicator, Linear Variable Differential Transformer, which indicates the actual assembly position. The position

INSERT E

indication accuracy of the Linear Variable Differential Transformer is approximately ±5% of span (±12 steps) under steady state conditions. The relative accuracy of the linear position indicator has been considered in establishing the maximum allowable deviation of a control rod assembly from its indicated group step demand position. In the event that the linear position indicator is not in service, the effects of malpositioned control rod assemblies are observable from nuclear and process information displayed in the Main Control Room and by core thermocouples and in-core movable detectors. Below 50% power, no special monitoring is required for malpositioned control rod assemblies with inoperable rod position indicators because, even with an unnoticed complete assembly misalignment (full length control rod assembly 12 feet out of alignment with its bank), operation at 50% steady state power does not result in exceeding core limits.

The "Thermal Soak" allowance below 50% power, during which the Rod Position Indication System tolerance requirement is relaxed, provides time for the system to reach thermal equilibrium. A total of one hour in twenty-four is available for this allowance, which may be a continuous hour or may consist of discrete, shorter intervals. For such a short period of time, a misaligned control rod assembly does not pose an unacceptable risk. At these conditions, the rod position indicators should still be used to verify rod movement but not their exact location. The tolerance is tightened after one hour to ensure that the thermal overshoot does not conceal an actual control rod assembly misalignment.

The reliance upon the step demand counters at HOT and COLD SHUTDOWN shifts the monitoring of control rod assembly position from the Rod Position Indication System to the more reliable demand counters when Reactor Coolant System temperature is changing greatly but the core remains subcritical. The step demand counters also provide precise group demand positions during the thermal soak period.

The specified control rod assembly drop time is consistent with safety analyses that have been performed.

An inoperable control rod assembly imposes additional demands on the operators. The permissible number of inoperable control rod assemblies is limited to one in order to limit the magnitude of the operating burden, but such a failure would not prevent dropping of the OPERABLE control rod assemblies upon reactor trip.

INSERT E (on pages TS 3.12-13 and TS 3.12-14):

The axial position of shutdown rods and control rods are determined by two separate and independent systems: the Bank Demand Position Indication System (commonly called the group step demand counters) and the Rod Position Indication System.

The Bank Demand Position Indication System counts the pulses from the Rod Control System that move the rods. There is one group step demand counter for each group of rods. Individual rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step demand counter for that group. The Bank Demand Position Indication System is considered highly precise ($\pm$ 2 steps).

The Rod Position Indication System provides an accurate indication of actual rod position, but at a lower precision than the group step demand counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube. The Rod Position Indication System is capable of monitoring rod position within at least $\pm$ 12 steps during steady state temperature conditions and within $\pm$ 24 steps during transient temperature conditions. Below 50% RATED POWER, a wider tolerance on indicated rod position for a maximum of one hour in every 24 hours is permitted to allow the system to reach thermal equilibrium. This thermal soak time is available both for a continuous one hour period or several discrete intervals as long as the total time does not exceed 1 hour in any 24 hour period and the indicated rod position does not exceed 24 steps from the group step demand counter position.

The requirements on the rod position indicators and the group step demand counters are only applicable from the movement of control banks to achieve criticality and with the REACTOR CRITICAL, because these are the only conditions in which the rods can affect core power distribution and in which the rods are relied upon to provide required shutdown margin. The various action statement time requirements are based on operating experience and reflect the significance of the circumstances with respect to verification of rod position and potential rod misalignment. Reduction of RATED POWER to less than or equal to 50% puts the core into a condition where rod position is not significantly affecting core peaking factors. Therefore, during operation below 50% of RATED POWER, no special monitoring is required. In the shutdown conditions, the operability of the shutdown banks and control banks has the potential to affect the required shutdown margin, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

4.10 REACTIVITY ANOMALIES

Applicability

Applies to potential reactivity anomalies.

Objective

To require evaluation of applicable reactivity anomalies within the reactor.

Specification

A. Following a normalization of the computed boron concentration as a function of burnup, the actual boron concentration of the coolant shall be compared monthly with the predicted value. If the difference between the observed and predicted steady-state concentrations reaches the equivalent of one percent in reactivity, an evaluation as to the cause of the discrepancy shall be made, ~~and reported to the Nuclear Regulatory Commission per Section 6.6 of these Specifications.~~ The provisions of Specification 4.0.4 are not applicable.

B. During periods of POWER OPERATION at greater than 10% of RATED POWER, the hot channel factors identified in Section 3.12 shall be determined during each effective full power month of operation using data from limited core maps. If these factors exceed their limits, an evaluation as to the cause of the anomaly shall be made. The provisions of Specification 4.0.4 are not applicable.

ATTACHMENT 3

PROPOSED TECHNICAL SPECIFICATIONS PAGES (TYPED)

Virginia Electric and Power Company
(Dominion)
Surry Power Station Units 1 and 2

3.12 CONTROL ROD ASSEMBLIES AND POWER DISTRIBUTION LIMITS

Applicability

Applies to the operation of the control rod assemblies and power distribution limits.

Objective

To ensure core subcriticality after a reactor trip, a limit on potential reactivity insertions from hypothetical control rod assembly ejection, and an acceptable core power distribution during power operation.

Specification

A. Control Bank Insertion Limits

1. Whenever the reactor is critical, except for physics tests and control rod assembly surveillance testing, each shutdown bank shall be within the insertion limits specified in the CORE OPERATING LIMITS REPORT. With one or more shutdown banks not within limits:

   a. Within 1 hour, verify shutdown margin is within the limits specified in the CORE OPERATING LIMITS REPORT or initiate boration to restore shutdown margin to within limit and

   b. Within 2 hours, restore shutdown banks to within limits.

   If the above requirements are not met, be in HOT SHUTDOWN within 6 hours.

2. Whenever the reactor is critical, except for physics tests and control rod assembly surveillance testing, the full length control banks shall be within the insertion limits specified in the CORE OPERATING LIMITS REPORT. With control bank insertion limits not met:

   a. Within 1 hour, verify shutdown margin is within the limits specified in the CORE OPERATING LIMITS REPORT or initiate boration to restore

shutdown margin to within limit and

b. Within 2 hours, restore control banks to within limits.

If the above requirements are not met, be in HOT SHUTDOWN within 6 hours.

3. The Control Bank Insertion Limits shown in the CORE OPERATING LIMITS REPORT may be revised on the basis of physics calculations and physics data obtained during unit startup and subsequent operation, in accordance with the following:

5. The allowable QUADRANT POWER TILT is 2.0% and is only applicable while operating at THERMAL POWER > 50%.

6. If, except for operation at THERMAL POWER < 50% or for physics and control rod assembly surveillance testing, the QUADRANT POWER TILT exceeds 2%, then:

   a. Within 2 hours, either the hot channel factors shall be determined and the power level adjusted to meet the requirement of Specification 3.12.B.1, or

   b. The power level shall be reduced from RATED POWER 2% for each percent of QUADRANT POWER TILT. The high neutron flux trip setpoint shall be similarly reduced within the following 4 hours.

   c. If the QUADRANT POWER TILT exceeds 10%, the power level shall be reduced from RATED POWER 2% for each percent of QUADRANT POWER TILT within the next 30 minutes. The high neutron flux trip setpoint shall be similarly reduced within the following 4 hours.

7. If, except for operation at THERMAL POWER < 50% or for physics and control rod assembly surveillance testing, after a further period of 24 hours, the QUADRANT POWER TILT in Specification 3.12.B.5 above is not corrected to less than 2%:

   a. If the design hot channel factors for RATED POWER are not exceeded, an evaluation as to the cause of the discrepancy shall be made and a special report issued to the Nuclear Regulatory Commission.

   b. If the design hot channel factors for RATED POWER are exceeded and the power is greater than 10%, then the high neutron flux, Overpower ΔT and Overtemperature ΔT trip setpoints shall be reduced 1% for each percent the hot channel factor exceeds the RATED POWER design values within the next 4 hours, and the Nuclear Regulatory Commission shall be notified.

c. If the hot channel factors are not determined, then the Overpower DT and Overtemperature ΔT trip setpoints shall be reduced by the equivalent of 2% power for every 1% QUADRANT POWER TILT within the next 4 hours, and the Nuclear Regulatory Commission shall be notified.

C. Control Rod Assemblies

1. To be considered OPERABLE during startup and POWER OPERATION each control rod assembly shall:

   1) be trippable,

   2) aligned within ± 12 steps or ± 24 steps of its group step demand position, as defined in Section 3.12.E.1.b, and

   3) have a drop time of less than or equal to 2.4 seconds to dashpot entry.

2. To be considered OPERABLE during shutdown modes, each control rod assembly shall:

   1) be trippable, and

   2) have a drop time of less than or equal to 2.4 seconds to dashpot entry.

3. Startup and POWER OPERATION may continue with one control rod assembly inoperable provided that within one hour either:

   a. The control rod assembly is restored to OPERABLE status, as defined in Specification 3.12.C.1 and 2, or

   b. the shutdown margin requirement of Specification 3.12.A.3.c is satisfied. POWER OPERATION may then continue provided that:

      1) either:

(a) power shall be reduced to less than 75% of RATED POWER within one (1) hour, and the High Neutron Flux trip setpoint shall be reduced to less than or equal to 85% of RATED POWER within the next four (4) hours, or

(b) the remainder of the control rod assemblies in the group with the inoperable control rod assembly are aligned to within 12 steps of the inoperable rod within one (1) hour while maintaining the control rod assembly sequence and insertion limits specified in the CORE OPERATING LIMITS REPORT; the THERMAL POWER level shall be restricted pursuant to Specification 3.12.A during subsequent operation.

2) the shutdown margin requirement of Specification 3.12.A.3.c is determined to be met within one hour and at least once per 12 hours thereafter.

3) the hot channel factors are shown to be within the design limits of Specification 3.12.B.1 within 72 hours. Further, it shall be demonstrated that the value of $F_{xy}(Z)$ used in the Constant Axial Offset Control analysis is still valid.

4) a reevaluation of each accident analysis of Table 3.12-1 is performed within 5 days. This reevaluation shall confirm that the previous analyzed results of these accidents remain valid for the duration of operation under these conditions.

E. Rod Position Indication System and Bank Demand Position Indication System

1. From movement of control banks to achieve criticality and with the REACTOR CRITICAL, rod position indication shall be provided as follows:

   a. Above 50% power, the Rod Position Indication System shall be OPERABLE and capable of determining the control rod assembly positions to within ± 12 steps of their respective group step demand counter indications.

   b. From movement of control banks to achieve criticality up to 50% power, the Rod Position Indication System shall be OPERABLE and capable of determining the control rod assembly positions to within ± 24 steps of their respective group step demand counter indications for a maximum of one hour out of twenty-four, and to within ± 12 steps otherwise.

   c. From movement of control banks to achieve criticality and with the REACTOR CRITICAL, the Bank Demand Position Indication System shall be OPERABLE and capable of determining the group demand positions to within ± 2 steps.

2. If one rod position indicator per group for one or more groups is inoperable, the position of the control rod assembly shall be verified indirectly using the movable incore detectors at least once per 8 hours and immediately after any motion of the non-indicating control rod assembly exceeding 24 steps. Alternatively, reduce power to less than 50% of RATED POWER within 8 hours. During operations below 50% of RATED POWER, no special monitoring is required.

3. If more than one rod position indicator per group is inoperable, place the control rods under manual control immediately, monitor and record RCS T_{avg} once per hour, verify the position of the control rod assemblies indirectly using the movable incore detectors at least once per 8 hours, and restore inoperable position indicators to OPERABLE status such that a maximum of one position indicator per group is inoperable within 24 hours.

4. If 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, verify the position of the control rod assemblies indirectly using the movable incore detectors within 4 hours or reduce power to less than 50% of RATED POWER within 8 hours.

5. If one group step demand counter per bank for more than one or more banks is inoperable, verify that all rod position indicators for the affected bank(s) are OPERABLE once per 8 hours and verify that the most withdrawn rod and the least withdrawn rod of the affected bank(s) are less than or equal to 12 steps apart once per 8 hours. Alternatively, reduce power to less than 50% of RATED POWER within 8 hours.

6. If the requirements of Specification 3.12.E.2, 3.12.E.3, 3.12.E.4, or 3.12.E.5 are not satisfied, then the unit shall be placed in HOT SHUTDOWN within 6 hours.

F. DNB Parameters

1. The following DNB related parameters shall be maintained within their limits during POWER OPERATION:

   - Reactor Coolant System $T_{avg} \leq 577.0°F$
   - Pressurizer Pressure $\geq$ 2205 psig
   - Reactor Coolant System Total Flow Rate $\geq$ 273,000 gpm

   a. The Reactor Coolant System T_{avg} and Pressurizer Pressure shall be verified to

be within their limits at least once every 12 hours.

b. The Reactor Coolant System Total Flow Rate shall be determined to be within its limit by measurement at least once per refueling cycle.

2. When any of the parameters in Specification 3.12.F.1 has been determined to exceed its limit, either restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less than 5% of RATED POWER within the next 4 hours.

3. The limit for Pressurizer Pressure in Specification 3.12.F.1 is not applicable during either a THERMAL POWER ramp increase in excess of 5% of RATED POWER per minute or a THERMAL POWER step increase in excess of 10% of RATED POWER.

G. Shutdown Margin

1. Whenever the reactor is subcritical, the shutdown margin shall be within the limits specified in the CORE OPERATING LIMITS REPORT. If the shutdown margin is not within limits, within 15 minutes, initiate boration to restore shutdown margin to within limits.

Basis

The reactivity control concept assumed for operation is that reactivity changes accompanying changes in reactor power are compensated by control rod assembly motion. Reactivity changes associated with xenon, samarium, fuel depletion, and large changes in reactor coolant temperature (operating temperature to COLD SHUTDOWN) are compensated for by changes in the soluble boron concentration. During POWER OPERATION, the shutdown control rod assemblies are fully withdrawn and control of power is by the control banks. A reactor trip occurring during POWER OPERATION will place the reactor into HOT SHUTDOWN. The control rod assembly insertion limits provide for achieving HOT SHUTDOWN by reactor trip at any time, assuming the highest worth control rod assembly remains fully withdrawn, with sufficient margins to meet the assumptions used in the accident analysis. In addition, they provide a limit on the maximum inserted control rod assembly worth in the unlikely event of a hypothetical assembly ejection and provide for acceptable nuclear peaking factors. The limit may be determined on the basis of unit startup and operating data to provide a more realistic limit which will allow for more flexibility in unit operation and still assure compliance with the shutdown requirement.

The maximum shutdown margin requirement occurs at end of core life and is based on the value used in the analyses of the hypothetical steam break accident. The control rod assembly insertion limits are based on end of core life conditions. The shutdown margin for the entire cycle length is established at 1.77% reactivity. Other accident analyses with the exception of the Chemical and Volume Control System malfunction analyses are based on 1% reactivity shutdown margin. Relative positions of control banks are determined by a specified control bank overlap. This overlap is based on the consideration of axial power shape control. The specified control rod assembly insertion limits have been established to limit the potential ejected control rod assembly worth in order to account for the effects of fuel densification. The various control rod assemblies (shutdown banks, control banks A, B, C, and D) are each to be moved as a bank; that is, with each assembly in the bank within one step (5/8 inch) of the bank position.

The axial position of shutdown rods and control rods are determined by two separate and independent systems: the Bank Demand Position Indication System (commonly called the group step demand counters) and the Rod Position Indication System.

The Bank Demand Position Indication System counts the pulses from the Rod Control System that move the rods. There is one group step demand counter for each group of rods. Individual

rods in a group all receive the same signal to move and should, therefore, all be at the same position indicated by the group step demand counter for that group. The Bank Demand Position Indication System is considered highly precise (± 2 steps).

The Rod Position Indication System provides an accurate indication of actual rod position, but at a lower precision than the group step demand counters. This system is based on inductive analog signals from a series of coils spaced along a hollow tube. The Rod Position Indication System is capable of monitoring rod position within at least ± 12 steps during steady state temperature conditions and within ± 24 steps during transient temperature conditions. Below 50% RATED POWER, a wider tolerance on indicated rod position for a maximum of one hour in every 24 hours is permitted to allow the system to reach thermal equilibrium. This thermal soak time is available both for a continuous one hour period or several discrete intervals as long as the total time does not exceed 1 hour in any 24 hour period and the indicated rod position does not exceed 24 steps from the group step demand counter position.

The requirements on the rod position indicators and the group step demand counters are only applicable from the movement of control banks to achieve criticality and with the REACTOR CRITICAL, because these are the only conditions in which the rods can affect core power distribution and in which the rods are relied upon to provide required shutdown margin. The various action statement time requirements are based on operating experience and reflect the significance of the circumstances with respect to verification of rod position and potential rod misalignment. Reduction of RATED POWER to less than or equal to 50% puts the core into a condition where rod position is not significantly affecting core peaking factors. Therefore, during operation below 50% RATED POWER, no special monitoring is required. In the shutdown conditions, the operability of the shutdown banks and control banks has the potential to affect the required shutdown margin, but this effect can be compensated for by an increase in the boron concentration of the Reactor Coolant System.

The specified control rod assembly drop time is consistent with safety analyses that have been performed.

An inoperable control rod assembly imposes additional demands on the operators. The permissible number of inoperable control rod assemblies is limited to one in order to limit the magnitude of the operating burden, but such a failure would not prevent dropping of the OPERABLE control rod assemblies upon reactor trip.

4.10 REACTIVITY ANOMALIES

Applicability

Applies to potential reactivity anomalies.

Objective

To require evaluation of applicable reactivity anomalies within the reactor.

Specification

A. Following a normalization of the computed boron concentration as a function of burnup, the actual boron concentration of the coolant shall be compared monthly with the predicted value. If the difference between the observed and predicted steady-state concentrations reaches the equivalent of one percent in reactivity, an evaluation as to the cause of the discrepancy shall be made. The provisions of Specification 4.0.4 are not applicable.

B. During periods of POWER OPERATION at greater than 10% of RATED POWER, the hot channel factors identified in Section 3.12 shall be determined during each effective full power month of operation using data from limited core maps. If these factors exceed their limits, an evaluation as to the cause of the anomaly shall be made. The provisions of Specification 4.0.4 are not applicable.