

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

May 11, 2022

10 CFR 50.90

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

Serial No.: 22-095
NRA/GDM: R0
Docket Nos.: 50-280/281
License Nos.: DPR-32/37

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
PROPOSED LICENSE AMENDMENT REQUEST
ADDITION OF ALTERNATE CONTROL ROD POSITION MONITORING
REQUIREMENTS

Pursuant to 10 CFR 50.90, Virginia Electric and Power Company (Dominion Energy Virginia) 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 (Surry) Units 1 and 2. The proposed change revises Surry Technical Specification (TS) 3.12.E, "Rod Position Indication System and Bank Demand Position Indication System," to provide an alternative monitoring option for the condition where a maximum of one rod position indicator per bank is inoperable. Specifically, as an alternative to determining the position of the non-indicating rod(s) indirectly by the movable incore detectors at a frequency of once per 8 hours, the change would allow rod position verification to be performed on a reduced periodicity, as well as based on the occurrence of rod movement or power level change. The proposed change is consistent with similar changes included in Technical Specifications Task Force Traveler 547, Revision 1, "Clarification of Rod Position Requirements," (ADAMS Accession No. ML15365A610), and would provide alternate TS Actions to allow the position of the rod to be monitored by a means other than movable incore detectors. Attachment 1 provides a description and assessment of the proposed change, and Attachments 2 and 3 provide marked-up and typed proposed TS pages, respectively. A related change to the TS 3.16 Basis is also being made and is included for the NRC's information.

Dominion Energy Virginia has evaluated the proposed amendment request and has determined it does not involve a significant hazards consideration as defined in 10 CFR 50.92. The basis for this 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 off-site or any 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 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(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.

Dominion Energy Virginia requests approval of the proposed TS change by May 31, 2023 with a 90-day implementation period.

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

Respectfully,

Douglas C. Lawrence
Vice President – Nuclear Engineering and Fleet Support

Commitments contained in this letter: None

Attachments:

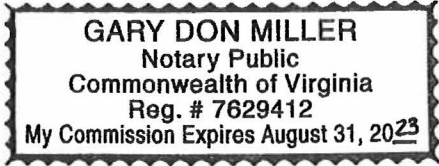
- 1. Description and Assessment
- 2. Proposed Technical Specifications and Basis Pages (Mark-up)
- 3. Proposed Technical Specifications and Basis Pages (Typed)

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Mr. Douglas C. Lawrence, who is Vice President – Nuclear Engineering and Fleet Support, 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 11th day of May, 2022.

My Commission Expires: August 31, 2023.

Notary Public

cc: U.S. Nuclear Regulatory Commission - Region II
Marquis One Tower
245 Peachtree Center Ave., NE Suite 1200
Atlanta, GA 30303-1257

NRC Senior Resident Inspector
Surry Power Station

Mr. L. John Klos
NRC Project Manager – Surry
U.S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 09 E-3
11555 Rockville Pike
Rockville, MD 20852-2738

Mr. G. Edward Miller
NRC Senior Project Manager – North Anna
U.S. Nuclear Regulatory Commission
One White Flint North
Mail Stop 09 E-3
11555 Rockville Pike
Rockville, MD 20852-2738

State Health Commissioner
Virginia Department of Health
James Madison Building – 7th floor
109 Governor Street
Suite 730
Richmond, VA 23219

Attachment 1

DESCRIPTION AND ASSESSMENT

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

TABLE OF CONTENTS

1.0 SUMMARY DESCRIPTION

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

2.2 Current Technical Specifications Requirements

2.3 Reason for the Proposed Change

2.4 Description of the Proposed Change

3.0 TECHNICAL EVALUATION

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements / Criteria

4.2 No Significant Hazards Consideration Determination

4.3 Conclusion

4.4 Precedents

5.0 ENVIRONMENTAL EVALUATION

6.0 REFERENCES

DESCRIPTION AND ASSESSMENT

1.0 SUMMARY DESCRIPTION

Pursuant to 10 CFR 50.90, Dominion Energy Virginia is submitting a license amendment request (LAR) to revise the Technical Specifications (TS) for Surry Power Station (SPS) Units 1 and 2. The LAR proposes revisions to TS 3.12.E.2 to provide an alternative monitoring option for the condition where a maximum of one rod position indicator (RPI) per bank is inoperable. Specifically, as an alternative to determining the position of the non-indicating rod(s) indirectly by the movable incore detectors at a frequency of once per 8 hours, the change would allow rod position verification to be performed, after initial position verification, by the movable incore detectors once every 31 Effective Full Power Days (EFPDs), as well as based on rod movement or power level change. The proposed revision is consistent with similar changes included in Technical Specifications Task Force (TSTF) Traveler 547, Revision 1, "Clarification of Rod Position Requirements," (Reference 6.1).

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

Reactivity control for SPS Units 1 and 2 is provided by boron dissolved in the reactor coolant, movable neutron-absorbing control rod assemblies, fixed burnable poison rods, and/or integral fuel burnable absorber. The control rod assemblies provide reactivity control for fast shutdown, reactivity changes associated with changes in the average coolant temperature above hot-zero-power temperature (since core average coolant temperature is increased with power level), reactivity associated with any void formation, and reactivity changes associated with the power coefficient of reactivity. The control rod assemblies are divided into two categories according to their function. Thirty-two control rod assemblies compensate for changes in reactivity due to variations in operating conditions of the reactor, such as power or temperature. They are divided into four control groups or banks, each consisting of eight assemblies. Sixteen control rod assemblies provide additional shutdown reactivity and are termed shutdown assemblies. The total shutdown worth of the control rod assemblies is specified to provide adequate shutdown margin (SDM) with the most reactive assembly stuck out of the core.

When the reactor is critical, means for showing the relative reactivity status are provided by control rod assembly bank positions displayed in the Main Control Room (MCR). The position of the control rod assembly banks is directly related to the reactivity status of the reactor when at power. The axial position of the control rod assembly banks is determined by two separate and independent systems: 1) the Rod Position Indication System (RPIS), and 2) the Bank Demand Position Indication System (BDPIS),

commonly referred to as the group step demand counters. These two systems provide the control room operator with redundant rod position indication to ensure compliance with the rod alignment and insertion limits specified in TS 3.12, "Control Rod Assemblies and Power Distribution Limits," and assumed in the plant accident analyses.

2.2 Current Technical Specifications Requirements

The SPS Units 1 and 2 TS are custom TS and therefore do not follow the Improved Standard TS format (i.e., NUREG-1431, *Standard Technical Specifications, Westinghouse Plants*). The operability requirements for the RPIS and the BDPIS in the SPS TS are contained in TS 3.12.E, "Rod Position Indication System and Bank Demand Position Indication System." Specifically, TS 3.12.E.1 contains the operability requirements for the RPIS and the BDPIS for movement of the control banks to achieve criticality and with the REACTOR CRITICAL. TS 3.12.E.2 specifies the required actions if one RPI per group for one or more groups is inoperable, while TS 3.12.E.3 provides the required actions if more than one RPI per group is inoperable. TS 3.12.E.4 provides the required actions 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, and TS 3.12.E.5 provides the required actions if one group step demand counter per bank for one or more banks is inoperable. 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 TS 3.12.E.6 requires the unit to be placed in HOT SHUTDOWN within 6 hours.

The surveillance requirements for the RPIS and the BDPIS are contained in TS 4.1, Table 4.1-1, "Minimum Frequencies for Check, Calibrations and Test of Instrument Channels," which requires instrument channel checks and calibrations of the systems to be performed in accordance with the Surveillance Frequency Control Program.

2.3 Reason for the Proposed Change

TS 3.12.E.2 currently requires one of two required actions to be taken if one rod position indicator per group for one or more groups is inoperable: 1) indirectly verify the position of the control rod assembly using the movable incore detectors at least once per 8 hours or 2) reduce power to less than 50% of RATED POWER within 8 hours. This 8-hour verification requirement would require using the movable incore detector system approximately ninety (90) times per month. While movable incore detector system wear does not pose a reduction in the margin of safety, excessive wear could result in a loss of functionality of the system and a plant shutdown. The proposed change revises TS 3.12.E.2 to provide an alternative to using the moveable incore detectors every 8 hours by utilizing a different monitoring method. Specifically, a new TS action is proposed that provides an alternative of performing the rod position verification as follows: 1) within 8 hours, 2) every 31 EFPDs thereafter, 3) within 8 hours following either intended or unintended rod movement, and 4) after significant changes in power level. Monitoring control rod position in this alternative manner would minimize excessive use of, and increased wear on, the movable incore detector system.

In addition, the 31 EFPDs verification periodicity coincides with the frequency of power distribution surveillances as required by TS 4.10, "Reactivity Anomalies," that use the movable incore detector system. The proposed revision is consistent with similar changes included in TSTF-547-A, Revision 1 (Reference 6.1).

2.4 Description of Proposed Change

The proposed change to TS 3.12.E.2 would add new actions that provide an alternative to the "at least once every 8 hours" verification of rod position using the movable incore detectors if one rod position indicator per group for one or more groups is inoperable.

TS 3.12.E.2 currently states:

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. 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.

The proposed change revises TS 3.12.E.2 to state:

2. *If one rod position indicator per group for one or more groups is inoperable, the following action a, b or c shall be taken:*
 - a. *The position of the control rod assembly shall be verified indirectly using the movable incore detectors at least once per 8 hours, or*
 - b. *The following indirect verification of control rod assembly position shall be performed using the movable incore detectors:*
 - (1) *Within 8 hours of the rod position indicator inoperability, and*
 - (2) *Once every 31 effective full power days thereafter, and*
 - (3) *Within 8 hours after each unintended rod movement, and*
 - (4) *Within 8 hours after each rod movement greater than 12 steps, and*
 - (5) *Prior to exceeding 50% RATED POWER if power is reduced below 50% RATED POWER, and*
 - (6) *Within 8 hours after reaching RATED POWER, or*
 - c. *Reduce power to less than 50% of RATED POWER within 8 hours. During operations below 50% of RATED POWER, no special monitoring is required.*

The following paragraph is also being added to the TS 3.12 Basis:

When a rod position indicator fails, the position of the rod can be verified by use of the movable incore detectors once every 8 hours (TS 3.12.E.2.a). TS 3.12.E.2.b allows an alternate method of monitoring control rod position using the movable incore detector system on a less frequent periodicity (i.e., initial position verification within 8 hours and every 31 effective full power days (EFPDs) thereafter) and with additional verification performed following circumstances in which rod position may have changed or after significant changes in power level have occurred. One of these circumstances is unintended rod movement, which is defined as the release of a rod's stationary gripper when no action was demanded either manually or automatically from the rod control system. Verification that no unintended rod movement occurred is performed by monitoring the rod control system stationary gripper coil current for indications of rod movement. The 31 EFPDs verification frequency minimizes excessive use of and increased wear on the movable incore monitoring system and accommodates concurrent performance with the existing TS 4.10 surveillance requirement for determination of hot channel factors. TS 3.12.E.2.c provides the alternative of reducing power to less than 50% of RATED POWER within 8 hours.

The marked-up TS 3.12 and TS 3.12 Basis pages and the typed proposed TS and TS Basis pages are provided in Attachments 2 and 3, respectively. The proposed TS 3.12 Basis revision is provided for the NRC's information.

3.0 TECHNICAL EVALUATION

The rod control system and the RPIS are used to ensure rod alignment and insertion limits are maintained. Operators utilize the RPIS to monitor the position of the control rods to ensure the plant is operating within the bounds of the accident analysis assumptions. Operability (i.e., trippability) and the position of the rods are initial condition assumptions in the safety analyses that assume rod insertion upon a reactor trip.

Control and shutdown rod position accuracy is essential during power operation. Power peaking, ejected rod worth, or SDM 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 SDM. The rod positions must also be known to verify the alignment limits are preserved.

Electrical failures may cause a control rod to become inoperable, to become misaligned from its group, or to be excessively inserted. Control rod inoperability, misalignment, or

rod insertion in excess of limits may violate the input assumptions of a design basis accident. Limits on control rod alignment, insertion, and operability have been established, and rod positions are monitored and controlled during shutdown and power operation to ensure safety analysis assumptions are satisfied.

Although the RPIS is a primary tool for verifying TS requirements for control rod position parameters, TS 3.12.E.2 currently allows for verification of rod position using the movable incore detector system if one rod position indicator per group for one or more groups is inoperable. Provided the TS-required control rod position verification and surveillance are satisfactorily performed, there is no impact to the safety analysis assumptions. The safety analysis does not specify the manner in which parameters are verified; it only requires those parameters meet certain criteria (e.g., TS operability requirements, Core Operating Limits Reports (COLR) limits, and TS surveillance requirements acceptance criteria).

SPS Units 1 and 2 TS 3.12.E ensures the rod position indicators (RPIs) are capable of determining the position of the control and shutdown rods. Proposed TS 3.12.E, Action 2.b, is consistent with TS 3.1.7, Action A.2.1, included in TSTF-547. The proposed action continues to use the movable incore detector system to monitor the position of the rod(s) with the inoperable rod position indicator(s). The initial position of the rod is determined within 8 hours and every 31 days of full power operation thereafter. The initial 8-hour completion time is the same as existing TS 3.12.E.2, and the 31-day period coincides with the typical frequency for performing the power distribution surveillance requirement that uses the movable incore detector system. If there is unintended movement of a rod, or if a rod with an inoperable RPI is moved more than 12 steps, the movable incore detectors are used to verify the rod position within 8 hours. If there are changes in core power, which could result in changes in rod position, the rod position must be verified before exceeding 50% Rated Power and within 8 hours of reaching full power. This confirms the position of the rod with an inoperable RPI to ensure power distribution requirements are not violated and to establish a starting point for the proposed alternate monitoring actions.

An unintended rod movement is defined as the release of the rod's stationary gripper when no action was demanded, either manually or automatically, from the rod control system or a rod motion in a direction other than the direction demanded by the rod control system. Verifying that no unintended rod movement has occurred is performed by monitoring the rod control system stationary gripper coil current for indications of rod movement.

The ability to immediately detect a rod drop or misalignment is not directly provided by the movable incore detectors used in current TS 3.12.E.2 or by the alternate monitoring method proposed in TS 3.12.E.2.b. However, should there be a rod drop, it will typically be detectable by the excore power range detectors. Additionally, a negative reactivity insertion corresponding to the reactivity worth of the dropped rod may cause a change in core parameters, such as axial flux difference (AFD) and quadrant power tilt ratio (QPTR).

Note the proposed TS action provides an alternative to the existing rod position indication requirements. The control bank insertion limits and the control rod assemblies' alignment limits included in Limiting Conditions of Operation (LCOs) 3.12.A and 3.12.C continue to require the rods to be operable and within the insertion limits.

The NRC staff provided a review of this change in their Safety Evaluation included in TSTF-547, Revision 1 (Reference 6.1). In their Safety Evaluation, the NRC concluded that if the rod position indication is failed for an individual rod, its position is determined indirectly by use of the moveable incore detectors. The NRC staff determined that this change, which verifies rod position using the movable incore detectors based on the occurrence of events requiring rod motion, rather than determining position on a specified frequency, is acceptable because events requiring rod motion of the shutdown banks and control banks A, B, C are relatively infrequent during steady state operation. Events involving significant movement of rods in control bank D are also relatively infrequent, and indirect determination of rod position is required after significant changes in power level or following substantial rod motion.

The NRC staff concluded the addition of an alternative monitoring scheme to indirectly determine the position of rods associated with an inoperable RPI is acceptable. TS 3.12.E, as modified, continues to specify the minimum performance level of equipment needed for safe operation of the facility as an LCO and continues to specify the appropriate remedial measures if the LCO is not met. The NRC staff found the requirements of 10 CFR 50.36(c)(2) continue to be met because the minimum performance level of equipment needed for safe operation of the facility is contained in the LCO, and the appropriate remedial measures are specified if the LCO is not met.

The requirement to "Restore inoperable [D]RPI to OPERABLE status," with a Completion Time of "Prior to entering MODE 2 from MODE 3," which was Proposed Action A.2.2 for TS 3.1.7 in TSTF-547 (which utilized the STS format) was not incorporated. Previous submittals by other licensees have concluded this required Action was included in TSTF-547 in error. Because STS 3.1.7 Actions A.1 and A.3 permit continued operation for an unlimited period of time in the Applicability of STS 3.1.7 in TSTF-547, STS LCO 3.0.4.a may be used to enter Mode 2 from Mode 3. As Actions A.1, A.2, and A.3 are joined by a logical OR, a licensee may choose to follow 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 Action A.2.2 does not apply in Mode 3 and is not restrictive after Mode 2 is entered. For these reasons, proposed Action A.2.2 in TSTF-547 is moot. More importantly, the requirement is not needed for plant safety. The NRC staff's Safety Evaluation for TSTF-547 (Reference 6.1) noted the monitoring method in Action A.2.1 is more appropriate than the existing method in Action A.1; therefore, its use should not be restricted. This variation was previously approved in Braidwood Station Amendments 196/196 and Byron Station Units 1 and 2 Amendments 202/202 (Reference 6.2), and Salem Units 1 and 2 Amendments 330/311 (Reference 6.3). Consequently, even

though the SPS Units 1 and 2 TS are custom TS that don't include TS 3.0.4 or Mode applicability for TS 3.12.E, the additional required action to restore the inoperable rod position indicator to OPERABLE status is not necessary for plant safety and has therefore not been included in the proposed TS change. Regardless, efforts to repair an inoperable rod position indicator would be made at the earliest practical opportunity.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements and Criteria

Atomic Energy Act - Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TS as part of the license. The TS ensure the operational capability of structures, systems, and components that are required to protect the health and safety of the public.

10 CFR Part 50

- 10 CFR 50.90 requires NRC approval for any modification to, addition to, or deletion from the plant TSs. Therefore, this activity requires NRC approval prior to making the proposed plant-specific changes included in this LAR.
- 10 CFR 50.36 requires the TSs to include items in the following specific categories: (1) safety limits, limiting safety systems settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) surveillance requirements per 10 CFR 50.36(c)(3); (4) design features; and (5) administrative controls. This amendment application is related to the second category above since a change to an LCO is proposed.
- 10 CFR 50, Appendix A, General Design Criteria - The regulations in Appendix A to Title 10 of the Code of Federal Regulations (10 CFR) Part 50 or similar plant-specific principal design criteria provide design requirements. Appendix B to 10 CFR 50, the TS, and the licensee quality assurance programs provide operating requirements. The current regulatory requirements of 10 CFR 50 Appendix A that are applicable to control rod position include: General Design Criteria (GDC) 13 – Instrumentation and Control, GDC 26 – Reactivity Control System Redundancy and Capability, and GDC 28 – Reactivity Limits.

During the initial plant licensing of SPS Units 1 and 2, it was demonstrated that the design of the RPIS met the regulatory requirements in place at that time. The GDC included in Appendix A to 10 CFR 50 did not become effective until May 21, 1971. The Construction Permits for SPS Units 1 and 2 were issued prior to May 21, 1971; consequently, SPS Units 1 and 2 were not subject to current GDC requirements (SECY-92-223, dated September 18, 1992). The following information demonstrates SPS Units 1 and 2 meet the intent of the applicable GDC published in

1967 (Draft GDC). Section 1.4 of the SPS Units 1 and 2 Updated Final Safety Analysis Report (UFSAR) discusses SPS compliance with these criteria.

o *Instrumentation and Control Systems (Criterion 12 - draft)*

Instrumentation and controls are provided as required to monitor and maintain within prescribed operating ranges essential reactor facility operating variables.

Instrumentation and controls essential to avoid undue risk to the health and safety of the public are provided to monitor and maintain neutron flux, primary coolant pressure and temperature, and control rod assembly positions within prescribed operating ranges.

The non-nuclear-regulating process and containment instrumentation measures temperatures, pressure, flow, and levels in the reactor coolant system, main steam system, containment, and auxiliary systems. Process variables required on a continuous basis for the start-up, operation, and shutdown of the unit are indicated, recorded, and controlled from the control room, into which access is supervised. The quantity and types of process instrumentation provided ensure the safe and orderly operation of all systems and processes over the full operating range of the station.

o *Fission Process Monitors and Controls (Criterion 13 – draft)*

Means are provided for monitoring or otherwise measuring and maintaining control over the fission process throughout core life under all conditions that can reasonably be anticipated to cause variations in the reactivity of the core.

Nuclear instrumentation is provided to monitor reactor power from the source range through the intermediate range and power range up to 120% of full power. The system provides indication, control, and alarm signals for reactor operation and protection.

The operational status of the reactor is monitored from the control room. When the reactor is subcritical, the relative reactivity status is continuously monitored and indicated by proportional counters located in instrument wells in the neutron shield tank adjacent to the reactor vessel. Two source detector channels supply information on multiplication while the reactor is subcritical.

When the reactor is critical, means for showing the relative reactivity status of the reactor are provided by control rod assembly bank positions displayed in the control room. The position of the control rod assembly banks is directly related to the reactivity status of the reactor when at power, and any unexpected change in the position of the control rod assembly banks under automatic control or any change in the coolant temperature under manual control provides a direct and

immediate indication of a change in the reactivity status of the reactor. Periodic sampling to determine the boric acid concentration provides a long-term means of following reactivity status.

4.2 No Significant Hazards Consideration Determination

Virginia Electric and Power Company (Dominion Energy Virginia) requests a revision to Surry Power Station Units 1 and 2 Technical Specification (TS) 3.12.E, "Rod Position Indication System and Bank Demand Position Indication System," to permit alternate monitoring of rod position with an inoperable rod position indicator. Currently, in the event that a rod position indicator is inoperable, TS 3.12.E.2 requires the verification of rod position by use of the movable incore detectors every 8 hours. The proposed revision to TS 3.12.E.2 continues to use the movable detector system to monitor the position of a rod with an inoperable rod position indicator on a less frequent periodicity (i.e., initial position verification within 8 hours and every 31 effective full power days thereafter) and with additional verification performed following circumstances in which rod position may have changed or significant power changes have occurred. The 31-day frequency minimizes excessive use of, and increased wear on, the movable incore detector monitoring system and accommodates concurrent performance with the existing surveillance requirement for determination of hot channel factors. This revision is consistent with similar changes included in Technical Specification Task Force Traveler (TSTF) 547, Revision 1, "Clarification of Rod Position Requirements," (ADAMS Accession No. ML15365A610).

In accordance with the criteria set forth in 10 CFR 50.92, Dominion Energy Virginia has evaluated whether a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. *Does the proposed change 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 accidents previously evaluated, such as rod ejection. The proposed change does not change the limiting conditions for operation (LCO) 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 an alternative to frequent use of the moveable incore detector system to verify the position of a rod with an inoperable rod position indicator does not change the requirement for the rod 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 of an accident previously evaluated.

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

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

Response: No.

While the proposed change provides an alternate method of determining the position of a control rod assembly with an inoperable rod position indicator, the proposed change does not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) and does not impact plant operation. Furthermore, the proposed change does not impose any new or different requirements that could initiate an accident. The proposed change does not alter assumptions made in the safety analysis and is consistent with the safety analysis.

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 change involve a significant reduction in a margin of safety?

Response: No.

The operability of the rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits. The proposed change does not alter the requirement to determine rod position but provides an alternate method for determining the position of the affected rod. There are no changes being made to any safety analysis assumptions, safety limits, or limiting safety system settings that would adversely affect plant safety margins as a result of the proposed change.

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

Based on the above, Dominion Energy Virginia concludes the proposed amendment 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.

4.3 Conclusion

The proposed change provides an alternative to frequent verification of rod position using the movable incore detectors. The proposed change does not change the requirement for the control rods to be aligned and within the insertion limits, does not alter the design or operation of any plant equipment, does not involve a physical alteration of the plant, does not alter assumptions made in the safety analysis, and is consistent with the safety analysis. Dominion Energy Virginia therefore concludes, based on the considerations discussed herein, that (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.

4.4 Precedents

The proposed change has been previously approved for other plants including Braidwood and Byron Stations Units 1 and 2 (Reference 6.2), Prairie Island Nuclear Generating Plant Units 1 and 2 (Reference 6.3), Salem Nuclear Generating Station Units 1 and 2 (Reference 6.4), Watts Bar Nuclear Plant Units 1 and 2 (Reference 6.5), and Millstone Power Station Unit 3 (Reference 6.6).

5.0 ENVIRONMENTAL EVALUATION

The proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9) 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 are no significant changes in the types or significant increase in the amounts of any effluents that may be released off-site.

The proposed change permits an alternate method of monitoring of rod position with an inoperable rod position indicator and does not involve the installation of any new equipment or modification of any equipment that may affect the types or amounts of effluents that may be released off-site. The proposed change will have no impact on normal plant releases and will not increase the predicted radiological consequences of accidents postulated in the UFSAR. There are no significant changes in the types or significant increase in the amounts of any effluents that may be released off-site.

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

The proposed change, which permits an alternate method of monitoring of rod position with an inoperable rod position indicator, does not involve plant physical 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 Energy Virginia concludes that, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed amendment.

6.0 REFERENCES

- 6.1 Final Safety Evaluation (SE) of TSTF-547, Rev. 1, "Clarification of Rod Position Requirements," March 4, 2016 (ADAMS Accession No. ML15328A350).
- 6.2 Letter from USNRC to Mr. Bryan C. Hanson (Exelon Generation Company, LLC), "Braidwood Station, Units 1 and 2, and Byron Station, Unit Nos. 1 and 2 - Issuance of Amendments Regarding Clarification of Rod Position Requirements (CAC Nos. MF9951, MF9952, MF9953, and MF9954; EPID L-2017-LLA-0249)," June 27, 2018 (ADAMS Accession No. ML18065A529)
- 6.3 Letter from USNRC to Mr. Christopher P. Domingos (Northern States Power Company), "Prairie Island Nuclear Generating Plant, Units 1 and 2 – Issuance of Amendment Nos. 233 and 221 Re: Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-547, "Clarification of Rod Position Requirements" (EPID L-2019-LLA-0295)," November 18, 2020 (ADAMS Accession Number ML20283A342).
- 6.4 Letter from USNRC to Mr. Eric Carr (PSEG Nuclear LLC), "Salem Nuclear Generating Station, Unit Nos. 1 and 2 - Issuance of Amendment Nos. 330 and 311 Re: Revise Technical Specifications to Adopt TSTF-547 (EPID L-2019-LLA-0018)," November 18, 2019 (ADAMS Accession Number ML19275D694).
- 6.5 Letter from USNRC to Mr. Joe Shea (Tennessee Valley Authority), "Watts Bar Nuclear Plant, Units 1 and 2 - Issuance of Amendments Regarding Adoption of TSTF-547, Clarification of Rod Position Requirements (CAC Nos. MF8912 AND MF8913; EPID L-2016-LLA-0034)," June 26, 2018 (ADAMS Accession Number ML18079A029).
- 6.6 Letter from USNRC to Mr. Daniel G. Stoddard (Dominion Energy Nuclear Connecticut, Inc.), "Millstone Power Station, Unit No. 3 – Issuance of Amendment No. 282 Re: Shutdown Bank Technical Specification Requirements and Alternate Control Rod Position Monitoring Requirements (EPID L-2021-LLA-0023)," February 16, 2022 (ADAMS Accession Number ML22007A151).

Attachment 2

PROPOSED TECHNICAL SPECIFICATIONS AND BASIS PAGES (MARK-UP)

(BASIS CHANGES ARE FOR NRC INFORMATION ONLY)

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

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. 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.~~



INSERT A

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.

← INSERT B

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.

INSERT A

2. If one rod position indicator per group for one or more groups is inoperable, the following action a or b or c shall be taken:
 - a. The position of the control rod assembly shall be verified indirectly using the movable incore detectors at least once per 8 hours, or
 - b. The following indirect verification of control rod assembly position shall be performed using the movable incore detectors:
 - (1) Within 8 hours of the rod position indicator inoperability, and
 - (2) Once every 31 effective full power days thereafter, and
 - (3) Within 8 hours after each unintended rod movement, and
 - (4) Within 8 hours after each rod movement greater than 12 steps, and
 - (5) Prior to exceeding 50% RATED POWER if power is reduced below 50% RATED POWER, and
 - (6) Within 8 hours after reaching RATED POWER, or
 - c. 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 B

When a rod position indicator fails, the position of the rod can be verified by use of the movable incore detectors once every 8 hours (TS 3.12.E.2.a). TS 3.12.E.2.b allows an alternate method of monitoring control rod position using the movable incore detector system on a less frequent periodicity (i.e., initial position verification within 8 hours and every 31 effective full power days (EFPDs) thereafter) and with additional verification performed following circumstances in which rod position may have changed or after significant changes in power level have occurred. One of these circumstances is unintended rod movement, which is defined as the release of a rod's stationary gripper when no action was demanded either manually or automatically from the rod control system. Verification that no unintended rod movement occurred is performed by monitoring the rod control system stationary gripper coil current for indications of rod movement. The 31 EFPDs verification frequency minimizes excessive use of and increased wear on the movable incore monitoring system and accommodates concurrent performance with the existing TS 4.10 surveillance requirement for determination of hot channel factors. TS 3.12.E.2.c provides the alternative of reducing power to less than 50% of RATED POWER within 8 hours.

Attachment 3

PROPOSED TECHNICAL SPECIFICATIONS AND BASIS PAGES (TYPED)

(TS BASIS CHANGE IS PROVIDED FOR NRC INFORMATION ONLY)

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

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 following action a or b or c shall be taken:
 - a. The position of the control rod assembly shall be verified indirectly using the movable incore detectors at least once per 8 hours, or
 - b. The following indirect verification of control rod assembly position shall be performed using the movable incore detectors:
 - (1) Within 8 hours of the rod position indicator inoperability, and
 - (2) Once every 31 effective full power days thereafter, and
 - (3) Within 8 hours after each unintended rod movement, and
 - (4) Within 8 hours after each rod movement greater than 12 steps, and

- (5) Prior to exceeding 50% RATED POWER if power is reduced below 50% RATED POWER, and
 - (6) Within 8 hours after reaching RATED POWER, or
- c. Reduce power to less than 50% of RATED POWER within 8 hours. During operations below 50% of RATED POWER, no special monitoring is required.

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.

When a rod position indicator fails, the position of the rod can be verified by use of the movable incore detectors once every 8 hours (TS 3.12.E.2.a). TS 3.12.E.2.b allows an alternate method of monitoring control rod position using the movable incore detector system on a less frequent periodicity (i.e., initial position verification within 8 hours and every 31 effective full power days (EFPDs) thereafter) and with additional verification performed following circumstances in which rod position may have changed or after significant changes in power level have occurred. One of these circumstances is unintended rod movement, which is defined as the release of a rod's stationary gripper when no action was demanded either manually or automatically from the rod control system. Verification that no unintended rod movement occurred is performed by monitoring the rod control system stationary gripper coil current for indications of rod movement. The 31 EFPDs verification frequency minimizes excessive use of and increased wear on the movable incore monitoring system and accommodates concurrent performance with the existing TS 4.10 surveillance requirement for determination of hot channel factors. TS 3.12.E.2.c provides the alternative of reducing power to less than 50% of RATED POWER within 8 hours.

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.