

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

August 8, 2022

10 CFR 50.90

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

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NRA/GDM: 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**  
**LICENSE AMENDMENT REQUEST**  
**10-DAY ALLOWED OUTAGE TIME FOR OPPOSITE UNIT AUXILIARY FEEDWATER**  
**(AFW) CROSS-CONNECT CAPABILITY**  
**SUPPLEMENTAL INFORMATION**

By letter dated June 20, 2022 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22172A134), Virginia Electric and Power Company (Dominion Energy Virginia) requested an amendment to Facility Subsequent Renewed Operating License Numbers DPR-32 and DPR-37 in the form of a change to the Technical Specifications (TS) for Surry Power Station (SPS) Units 1 and 2. The proposed change revises SPS TS 3.6.1.2 to include a 10-day Allowed Outage Time (AOT) for opposite unit Auxiliary Feedwater (AFW) cross-connect capability specific to when maintenance that would result in the inoperability of all three of the opposite unit's Auxiliary Feedwater (AFW) pumps is being performed. By letter dated July 25, 2022 (ADAMS Accession No. ML22202A047), the Nuclear Regulatory Commission (NRC) informed Dominion Energy Virginia that additional information was required before the NRC would accept the license amendment request (LAR) for formal review. A conference call was held on July 25, 2022, to clarify the supplemental information the NRC needed to complete their acceptance review. The NRC provided Dominion Energy Virginia an opportunity to supplement the proposed LAR by submitting the requested supplemental information within thirteen working days, i.e., by August 11, 2022.

Dominion Energy Virginia's response to the NRC request for supplemental information is provided in the attachment. The information provided does not affect the conclusions of the no significant hazards consideration determination or the environmental assessment included in the June 20, 2022 LAR. Dominion Energy Virginia's request for NRC review and approval of the proposed LAR by April 30, 2023, with a 30-day implementation period is unchanged.



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**Attachment**

**RESPONSE TO NRC REQUEST FOR SUPPLEMENTAL INFORMATION**

**PROPOSED LICENSE AMENDMENT REQUEST**

**10-DAY ALLOWED OUTAGE TIME FOR OPPOSITE UNIT AUXILIARY FEEDWATER  
CROSS-CONNECT CAPABILITY**

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

## RESPONSE TO NRC REQUEST FOR SUPPLEMENTAL INFORMATION

### SURRY POWER STATION UNITS 1 AND 2

#### Background

By letter dated June 20, 2022 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22172A134), Dominion Energy Virginia requested an amendment to Facility Subsequent Renewed Operating License Numbers DPR-32 and DPR-37 in the form of a change to the Technical Specifications (TS) for Surry Power Station (SPS) Units 1 and 2. The proposed change revises SPS TS 3.6.I.2 to include a 10-day Allowed Outage Time (AOT) for opposite unit Auxiliary Feedwater (AFW) cross-connect capability specific to when maintenance that would result in the inoperability of all three of the opposite unit's Auxiliary Feedwater (AFW) pumps is being performed. By letter dated July 25, 2022 (ADAMS Accession No. ML22202A047), the Nuclear Regulatory Commission (NRC) informed Dominion Energy Virginia that additional information was required before the NRC would accept the license amendment request (LAR) for formal review. A conference call was held on July 25, 2022, to clarify the supplemental information the NRC needed to complete their acceptance review. The NRC provided Dominion Energy Virginia an opportunity to supplement the proposed LAR by submitting the requested supplemental information within thirteen working days, i.e., by August 11, 2022.

Dominion Energy Virginia's response to the NRC request for supplemental information is provided below.

#### NRC Comment

*The licensee stated that the proposed change is based on a risk evaluation performed in accordance with Regulatory Guides (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," (ML17317A256) and RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decision-making: Technical Specifications," (ML20164A034). To support the acceptance review, the NRC staff requests that Dominion Energy Virginia supplement the application to address the below:*

- A. *Per RG 1.174 and RG 1.177, describe how the proposed licensing action meets the following principles of risk-informed decision making: (NOTE: Principle 4 is discussed in the LAR).*
- 1) *Principle 1: The proposed licensing basis change meets the current regulations unless it is explicitly related to a requested exemption (i.e., under 10 CFR 50.12, "Specific Exemptions").*

The proposed licensing basis change meets current regulations and is being requested pursuant to 10 CFR 50.90 requirements. Upon adoption of this change, it will be acceptable to remove the AFW cross-connect from service for 10 days for the specific purpose of performing maintenance that would render the opposite unit's three AFW pumps inoperable. Therefore, unavailability of the AFW cross-connect will be limited to the 10-day duration and for this specific purpose. No exemptions are being requested.

*2) Principle 2: The proposed licensing basis change is consistent with the defense-in-depth philosophy.*

The proposed change is consistent with the defense-in-depth philosophy. The SPS AFW system is a diverse system that has two independent trains of motor-driven pumps and a third train with a steam driven pump. In most scenarios, the likelihood of losing all three trains of one unit's AFW system is very low. The SPS AFW cross-connect provides defense-in-depth during a loss of a unit's AFW and provides decay heat removal during a fire or high energy line break in the main steam valve house where the AFW pumps are located because those scenarios can impact all three AFW pumps for one unit. Under the proposed change, a Beyond Design Basis (BDB)/FLEX pump capable of providing AFW flow to the affected unit will be pre-staged for use if needed whenever the 10-day AOT is entered. Since the diesel-driven BDB/FLEX pump can provide AFW flow for decay heat removal in all of the scenarios where the AFW cross-connect would normally be used, the normal level of defense-in-depth is preserved for all relevant accident scenarios.

*3) Principle 3: The proposed licensing basis change maintains sufficient safety margins.*

The proposed change maintains sufficient safety margins for accident mitigation. An extended period without the AFW cross-connect available requires an alternate method to provide decay heat removal for the scenarios that depend upon the cross-connect. As noted in the response provided for Principle 2, the staging of a BDB/FLEX pump that can provide AFW flow to the unit that would normally use the AFW cross-connect will ensure safe shutdown capability is maintained during the extended AOT. The availability and pre-staging of the BDB/FLEX pump whenever the 10-day AOT is entered, in addition to the other required compensatory actions specified in the LAR, will maintain appropriate safety margins at all times.

*4) Principle 5: The impact of the proposed licensing basis change should be monitored using performance measurement strategies.*

The impact of the proposed change will be monitored to ensure high levels of performance are maintained. The proposed AOT will limit individual instances of AFW cross-connect unavailability to 10 days when performing maintenance that would render the opposite unit's three AFW pumps inoperable and was determined to be reasonable and safe with the identified compensatory measures in place to mitigate risk. The

Maintenance Rule, implemented in accordance with 10 CFR 50.65, will ensure that maintenance appropriately balances reliability and availability of the systems, structures and components (SSCs) related to the AFW cross-connect by tracking unavailability hours or by trending integrated risk. These actions, in conjunction with the corrective action program, will ensure any adverse trends in AFW availability or equipment reliability performance are promptly and effectively addressed.

*B) Per RG 1.174 and RG 1.177, identify and discuss the key assumptions and key sources of uncertainty related to the proposed change in the LAR for the internal events PRA and fire and seismic evaluations.*

The dominant risk scenario related to the unavailability of the AFW cross-connect is a high energy line break or fire sequences that impact all three of one unit's AFW pumps. In these scenarios, the plant typically relies on either the AFW cross-connect or primary system feed and bleed to provide decay heat removal. The staged BDB/FLEX pump to be used in place of the AFW cross-connect during the proposed AFW cross-connect 10-day AOT provides a method for decay heat removal before having to initiate feed and bleed. Key assumptions or sources of uncertainty that would be critical to this analysis would be those that have a significant impact on the inputs or modeling of these scenarios.

Key assumptions and sources of uncertainty were reviewed in preparation of the risk assessment to support the LAR. Dominion Energy Virginia documents assumptions and sources of uncertainty for the probabilistic risk assessment (PRA) in the SPS PRA notebook, SU-NOTEBK-PRA-SPS-QU.4, Revision 2. Sources of uncertainty were determined to be appropriately addressed for this application. For example, Electric Power Research Institute (EPRI) Technical Report (TR)-1016737, "Treatment of Parameter and Modeling Uncertainty for Probabilistic Risk Assessments," identifies an industry generic source of uncertainty related to how many power-operated relief valves (PORVs) are required for feed and bleed cooling. This potential source of uncertainty is relevant to this application because the reliability of the feed and bleed function is important to dominant risk scenarios. However, Dominion Energy Virginia has performed thermohydraulic analysis using the Modular Accident Analysis Program (MAAP) to provide the basis for how many PORVs are modeled as required in different scenarios, so this is not considered a key source of uncertainty for this application.

Plant specific assumptions and sources of uncertainty were also reviewed. For example, since incorporating BDB/FLEX components into PRA, reliability of this equipment has been considered a source of uncertainty since there was limited reliability data for portable equipment. This equipment was not modeled in the internal events analysis, but it was credited in the fire risk assessment. Pressurized Water Reactor Owners Group (PWROG) report PWROG-18043-P, "FLEX Equipment Data Collection and Analysis," documents industry reliability data and analysis for portable equipment. It was observed that portable equipment is generally reliable, and that

observed failure rates are higher than installed equipment but lower than the typical estimation of BDB/FLEX Human Error Probabilities (HEPs). Estimation of HEPs is also considered a potential source of uncertainty because of the technically complex nature of what is being assessed. This issue is addressed by using industry consensus methods and taking steps such as pre-staging equipment to improve the likelihood of successful operator action in the time required. Overall, the combined reliability and HEP value of 0.1 for the use of the pre-staged BDB/FLEX pump in the fire risk assessment is considered sufficiently conservative to address these considerations, and because the analysis is acceptable with this conservatism, this is not considered a key source of uncertainty for the LAR.

In a typical Extended Loss of AC Power (ELAP) event, there is some uncertainty related to the timing of deploying equipment. This is because there may be a delay in declaring an ELAP, some types of events may need debris to be cleared, and equipment must be transported from the BDB storage dome and staged before it can be used. Since the strategy to use the BDB/FLEX pump is preplanned and one pump is pre-staged, these typical sources of uncertainty do not apply to this application. Additionally, since the dominant risk scenarios involve a fire or high energy line break, the path would be clear to deploy a second pump if there were a reliability issue with the pre-staged pump.

There is some uncertainty in the assumption that seismic failures for components mounted in the same direction would be fully correlated. If failure of all AFW pumps were not fully correlated, then the likelihood of losing the entire AFW system during a seismic event would be low due to the robust design of the system and the diversity of the three AFW trains on each unit as described above. This consideration, combined with the low frequency of seismic events significant enough to damage equipment, means the seismic risk impact of the 10-day AOT would be very low even if it was assumed that AFW pump failures were not correlated. Consequently, this assumption is not considered a key source of uncertainty for this application.

In conclusion, there are no key model assumptions or sources of uncertainty that needed to be addressed further with sensitivity studies to confirm the results and conclusions of the risk assessment performed to support the LAR.