

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

August 14, 2020

10 CFR 50.69  
10 CFR 50.90

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

Serial No.: 20-201A  
NRA/GDM: R2  
Docket Nos.: 50-280/281  
License Nos.: DPR-32/37

**VIRGINIA ELECTRIC AND POWER COMPANY**  
**SURRY POWER STATION UNITS 1 AND 2**  
**LICENSE AMENDMENT REQUEST TO ADOPT 10 CFR 50.69**  
**SUPPLEMENTAL RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

By letter dated December 6, 2019 (ADAMS Accession No. ML19343A019), Virginia Electric and Power Company (Dominion Energy Virginia) submitted a license amendment request (LAR) for Surry Power Station (SPS) Units 1 and 2. The proposed license amendment would modify the SPS licensing basis by the addition of a license condition to allow for the implementation of the provisions of 10 CFR 50.69, "Risk-Informed Categorization and Treatment of Structures, Systems and Components for Nuclear Power Reactors." By letter dated June 29, 2020 (ADAMS Accession No. ML20181A422), Dominion Energy Virginia responded to an NRC request for additional information (RAI). On August 4, 2020, Dominion Energy Virginia and NRC staff held a conference call to discuss one of the responses to the RAI associated with screening of tornado missile hazards, as well as program commitments. At the conclusion of the call, Dominion Energy Virginia agreed to provide a supplemental response to address these two items. Dominion Energy Virginia's supplemental response is provided in Attachment 1, and an updated list of commitments is provided in Attachment 2.

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

Sincerely,



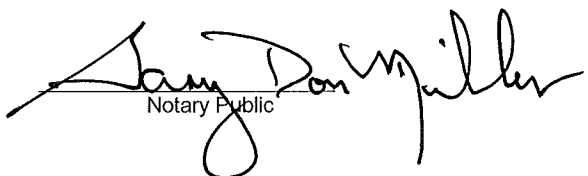
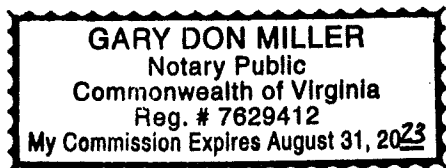
Mark D. Sartain  
Vice-President – Nuclear Engineering and Fleet Support

COMMONWEALTH OF VIRGINIA )  
  )  
COUNTY OF HENRICO                )

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Mark D. Sartain, 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 14<sup>th</sup> day of August, 2020.

My Commission Expires: August 31, 2023

  
Notary Public

Commitments made in this letter:

See Attachment 2 for an updated list of regulatory commitments.

Attachments:

1. Supplemental Response to NRC Request for Additional Information Regarding License Amendment Request to Adopt 10 CFR 50.69
2. Updated List of Regulatory Commitments

cc: U.S. Nuclear Regulatory Commission  
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State Health Commissioner  
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**Attachment 1**

**SUPPLEMENTAL RESPONSE TO NRC REQUEST FOR ADDITIONAL  
INFORMATION REGARDING LICENSE AMENDMENT REQUEST  
TO ADOPT 10 CFR 50.69**

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

**SUPPLEMENTAL RESPONSE TO NRC REQUEST FOR ADDITIONAL  
INFORMATION REGARDING  
LICENSE AMENDMENT REQUEST TO ADOPT 10 CFR 50.69**

**NRC Comment #1:**

***RAI 07.a.01 – SSCs Categorization Based on Other External Hazards (APLC)***

*The RAI 07.a response, regarding the Tornado Missile Hazard, states that multiple design tornado missile protection nonconformances were identified in response to RIS 2015-06.<sup>1</sup> The response also states that the risk of the non-conformances was determined to be below acceptable limits, but does not explain what is meant by acceptable or its applicability to the screening criteria. It is not clear to the NRC staff that the effect of the identified nonconformances was incorporated in determining the applicability of the screening criteria (C1, PS2, and PS4) listed in Attachment 4 of the LAR to the tornado missile hazard. Thus, the licensee is requested to address the following:*

- a) Provide justification for the screening of this hazard and the basis for the new evaluation. Specifically address how nonconformances are addressed in the screening.*
- b) Alternatively, explain how the risk of this hazard is included in 50.69 evaluations.*

**Dominion Energy Virginia Supplemental Response**

**Justification for Screening Tornado Missile Hazard:**

Dominion Energy Virginia screened out External Tornado Hazards using the Progressive Screening Approach for addressing external hazards as allowed by the PRA standard ASME/ANS Standard RA-Sa-2009.

Based on the Surry Power Station (Surry) Updated Final Safety Analysis Report (UFSAR), the Class 1 structures and systems, or parts thereof, whose failure might prevent the simultaneous cold shutdown of both reactor units during a loss-of-power incident, will withstand by design a tornado with the following characteristics and associated effects:

1. Rotational wind velocity of 300 mph.
2. A pressure drop of 3 psi in 3 seconds.
3. Translational velocity of 60 mph.

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<sup>1</sup> U.S. Nuclear Regulatory Commission, “NRC Regulatory Issue Summary 2015-06 Tornado Missile Protection,” June 10, 2015 (ADAMS Accession No. ML15020A419).

4. Missile equivalent to a wooden utility pole 40-foot long, with a 12-inch diameter, weighing 50 lb/ft<sup>3</sup>, and traveling in a vertical or horizontal direction at 150 mph.
5. Missile equivalent to a 1-ton automobile traveling at 150 mph.

The frequency of a design basis tornado is less than 1E-6 using the data from NUMARC/CR 4461; therefore, the hazard screens out for large tornados based on criterion C1 (refer to Attachment 5 of the LAR which is also provided below). For large missiles and impacts from tornado winds, the Surry design basis meets the 1975 Standard Review Plan (SRP) tornado missile criteria and therefore screens out under criterion PS2.

The Surry design basis was not evaluated against the 1975 SRP criteria for smaller missiles (e.g. Missile Types A, B, and C from NUREG 0800); therefore, small missiles were evaluated to ensure the screening criteria was met. An initial bounding analysis was performed and concluded the core damage frequency (CDF) was less than 1E-6 with the assumption that 1000 square feet of exposed area is subject to missile impact due to smaller missiles.

Since that time, a walkdown has been completed to determine areas where safety related equipment required to be protected from tornado missiles is vulnerable to missiles and considered non-conforming per NRC RIS-2015-06, "Tornado Missile Protection." The total exposed area of the non-conforming equipment and piping was determined to be approximately 739 square feet which is less than the 1000 square feet assumed in the bounding analysis performed for smaller missiles.

NEI 17-02, "Tornado Missile Risk Evaluator (TMRE) Industry Guidance Document," describes the method for conservatively assessing the risks posed by tornado-generated missiles. Surry has completed a TMRE review using NEI 17-02, and the results of the review determined the CDF for the non-conforming case was 7.64 E-7 and the large early release frequency (LERF) was 3.87E-8. These values would be bounding for large and small missiles since the analysis uses the full range of missile types and considers the non-conforming total exposed area. Additionally, the fragility of the equipment assumed to be hit by a tornado-generated missile was assumed to be 1.0. Therefore, using the results of the TMRE non-conforming case as the bounding analysis, tornado missiles screen out under criterion PS4 for a CDF less than 1E-6.

The bounding analysis from the associated TMRE provided justification for screening tornado missiles and associated non-conforming conditions.

Furthermore, the tornado wind speeds specified in the UFSAR were compared with the wind speeds used in the design calculations for the Surry structures, and it was determined the tornado wind velocity used in the design basis calculations and design specification (NUS-0037) for Tornado Criterion "T" structures at Surry (i.e., 300 mph) did

not agree with the tornado wind velocity as listed in the Surry UFSAR, Section 15.2.3 (i.e., 360 mph – comprised of rotational (300 mph) + translational (60 mph) velocities). Further evaluation determined the reinforced concrete Criterion “T” structures were adequate for wind speeds up to 360 mph.

However, several buildings on site are constructed of steel superstructures that house safe shutdown equipment or have the potential of damaging adjacent safety related structures and have on-going evaluations for wind speed (360 mph). Minor wind speed differences by themselves will not affect the conclusions of the bounding analysis since based on input from NUMARC/CR 4461 the frequency of exceedance for wind speeds greater than 205 mph is less than 1E-6 for Surry.

#### Fuel Building

The “Fuel-handling trolley support structure” in the Fuel Building has not been evaluated for 360 mph winds; however, damage of this structure will not affect safe shutdown equipment. Consequently, it will not affect the High Winds screening criteria.

#### Auxiliary Building

An analysis is on-going to demonstrate the supporting structural steel beams and columns supporting the reinforced concrete slab at EL. 45'-10” of the Surry Auxiliary Building can withstand the combined effects of tornado winds and differential pressures of a design basis tornado event without collapsing upon any identified safe shutdown equipment. Prior to implementation of the Surry 50.69 categorization process, Dominion Energy Virginia will confirm the adequacy of the Auxiliary Building steel superstructure to withstand the combined effects noted above; however, the bounding analysis from the TMRE already assumes failure of the affected safe shutdown equipment based on missile strike probability.

#### Turbine Building

The Turbine Building was previously evaluated to wind speeds up to 300 mph, and it was concluded adjacent safety related structures or safe shutdown equipment will not be damaged as a result of a tornado event. The 300-mph wind speed input for the Turbine Building was used in the TMRE evaluation. Based on input from NUMARC/CR 4461, the frequency of exceedance for wind speeds greater than 205 mph is less than 1E-6 for Surry. There is an on-going analysis to re-evaluate the Turbine Building for the combined effects of tornado winds and differential pressures. Prior to implementation of the Surry 50.69 categorization process, Dominion Energy Virginia will confirm the Turbine Building structural analysis supports the bounding analysis for screening high winds.

## **NRC Comment #2**

*The NRC staff completed its review of RAIs 03.b.ii and 11 and found the responses to be acceptable. However, the licensee omitted two commitments, as detailed below, that should be added in Attachment 4 (List of Regulatory Commitments Included in this Correspondence) of the response. Clarification via supplement or revised response is ok.*

### ***RAI 03.b.ii – Crediting of FLEX in the PRA Model (APLA)***

*The response to RAI 03.b.ii states, “[p]rior to categorization, pre-initiator HFEs [for mitigating strategies] will be assessed ...” However, apparently no corresponding commitment was provided in Attachment 4 of the response. Provide an updated commitment list that includes this action.*

### ***RAI 11 – Implementation Items (APLA/APLC)***

*The disposition to F&O SY-A11-01, provided in Attachment 3 of Enclosure 1 of the LAR, states, “[b]efore implementation...[a]ny components not screened based on SR SY-A15 will be incorporated into the PRA FPIE model.” However, apparently no corresponding commitment was provided in Attachment 4 of the response. Provide an updated commitment list that includes this action.*

## **Dominion Energy Virginia Response**

In response to NRC Comment No. 2, the list of regulatory commitments included in Attachment 4 of Dominion Energy Virginia’s June 29, 2020 RAI response has been revised to include the following two additional commitments as Item Nos. 6 and 7:

6. Prior to categorization, pre-initiator HFEs for mitigating strategies will be assessed.
7. Any components not screened based on SR SY-A15 will be incorporated into the PRA FPIE model.

In addition, the two commitments regarding the completion of the Auxilliary and Turbine Buildings’ structural reanalyses discussed above have also been included as regulatory commitments 8 and 9. The Updated List of Regulatory Commitments is provided in Attachment 2.

**Attachment 5 – Progressive Screening Approach for Addressing External Hazards**  
*(excerpted from the License Amendment Request dated December 6, 2019)*

This attachment provides the Progressive Screening Approach for Addressing External Hazards table.

<b>Event Analysis</b>	<b>Criterion</b>	<b>Source</b>	<b>Comments</b>
Initial Preliminary Screening	C1. Event damage potential is < events for which plant is designed.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	
	C2. Event has lower mean frequency and no worse consequences than other events analyzed.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	
	C3. Event cannot occur close enough to the plant to affect it.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	
	C4. Event is included in the definition of another event.	NUREG/CR-2300 and ASME/ANS Standard RA-Sa-2009	Not used to screen. Used only to include within another event.
	C5. Event develops slowly, allowing adequate time to eliminate or mitigate the threat.	ASME/ANS Standard	
Progressive Screening	PS1. Design basis hazard cannot cause a core damage accident.	ASME/ANS Standard RA-Sa-2009	
	PS2. Design basis for the event meets the criteria in the NRC 1975 Standard Review Plan (SRP).	NUREG-1407 and ASME/ANS Standard RA-Sa-2009	



Event Analysis	Criterion	Source	Comments
	PS3. Design basis event mean frequency is < 1E-5/y and the mean conditional core damage probability is < 0.1.	NUREG-1407 as modified in ASME/ANS Standard RA-Sa-2009	
	PS4. Bounding mean CDF is < 1E-6/y.	NUREG-1407 and ASME/ANS Standard RA-Sa-2009	
Detailed PRA	Screening not successful. PRA needs to meet requirements in the ASME/ANS PRA Standard.	NUREG-1407 and ASME/ANS Standard RA-Sa-2009	

**Attachment 2**

**UPDATED LIST OF REGULATORY COMMITMENTS**

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

<b>Updated List of Regulatory Commitments</b>	
<p>1. Revise Procedure ER-AA-RIE-103, <i>Categorization Process</i>, to describe the categorization of interfacing system components.</p>	<p>These regulatory commitments will be entered into the station's licensing commitment tracking program and will be completed prior to implementation of the Surry Power Station 10 CFR 50.69 SSC risk categorization process.</p>
<p>2. Perform model changes to reflect multiple FLEX equipment available, associated common cause failures, and data update to include PWROG provided generic data.</p>	
<p>3. Perform a sensitivity study per NEI 00-04 to increase the component common cause events to their 5th and 95th percentile values as part of the required 50.69 PRA categorization sensitivity cases.</p> <p>Develop a procedure requirement to perform a sensitivity study on the independent FLEX failures using the 5th and 95th percentile values.</p>	
<p>4. Revise Procedure ER-AA-RIE-101, <i>Active Component Risk Significance Insights</i>, to communicate to the IDP any PRA level of detail modeling simplifications (i.e., PRA assumption/sources of uncertainty disposition identifier I10) that impact plant risk for the system being categorized.</p>	
<p>5. Develop and/or update applicable station procedures to provide appropriate guidance to station personnel on the actions required to respond to a beyond design basis event associated with response to a failure of the intake canal.</p>	
<p>6. Prior to categorization, re-initiator HFES for mitigating strategies will be assessed.</p>	
<p>7. Any components not screened based on SR SY-A15 will be incorporated into the PRA FPIE model.</p>	
<p>8. Confirm the supporting structural steel beams and columns supporting the reinforced concrete slab at EL. 45'-10" of the Surry Auxiliary Building can withstand the combined effects of tornado winds and differential pressures of a design basis tornado event, without collapsing upon any identified safe shutdown equipment.</p>	
<p>9. Confirm the ongoing Turbine Building structural reanalysis supports the bounding analysis for screening high winds.</p>	