



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

October 3, 2022

Mr. Daniel G. Stoddard  
Senior Vice President and  
Chief Nuclear Officer  
Dominion Nuclear  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060-6711

SUBJECT: SURRY POWER STATION, UNITS 1 AND 2 – SURRY TORNADO  
CLASSIFICATION OF THE FUEL HANDLING TROLLEY SUPPORT  
STRUCTURE LAR AUDIT PLAN (EPID L-2022-LLA-0068)

Dear Mr. Stoddard:

By letter dated May 11, 2022, as supplemented by letter dated July 11, 2022 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML22131A351 and ML22192A075, respectively), Virginia Electric and Power Company (the licensee, Dominion Energy Virginia) submitted a license amendment request (LAR) for Surry Power Station, Units 1 and 2 (Surry). In its LAR, Dominion Energy Virginia proposed to apply a risk-informed approach to demonstrate that the Fuel Handling Trolley Support Structure, as designed, meets the intent of a tornado resistant structure under the current Surry licensing basis for a 360 miles per hour maximum tornado wind speed.

Subsequent to acceptance of the proposed amendments, the U.S. Nuclear Regulatory Commission (NRC) staff has identified the need for a regulatory audit to examine the Dominion's non-docketed information with the intent to gain understanding, to verify information, or to identify information that will require docketing to support the basis of the licensing or regulatory decision.

The NRC will conduct the audit virtually via Teams using a licensee-established electronic portal available to NRC staff from approximately October 14, 2022, and all activities are scheduled to be completed by December 31, 2022. The outline for the logistics, schedule, and scope of this audit were initially discussed with your staff in September 2022. The detailed audit plan is enclosed with this letter

D. Stoddard

- 2 -

If you have any questions, please contact me at (301) 415-5136 or by email at [John.Klos@nrc.gov](mailto:John.Klos@nrc.gov).

Sincerely,

*/RA/*

John Klos, Project Manager  
Plant Licensing Branch II-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-280 and 50-281

Enclosure:  
Audit Plan

cc: Listserv

## REGULATORY AUDIT PLAN

BY THE OFFICE OF NUCLEAR REACTOR REGULATION TO SUPPORT REVIEW OF THE

LICENSE AMENDMENT REQUEST TO APPLY A RISK-INFORMED APPROACH

TO MEET THE SURRY LICENSING BASIS FOR TORNADO CLASSIFICATION OF

THE FUEL HANDLING TROLLEY SUPPORT STRUCTURE

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY POWER STATION, UNIT NOS. 1 AND 2

DOCKET NOS. 50-280 AND 50-281

### 1.0 BACKGROUND

By letters dated May 11, 2022, as supplemented by letter dated July 11, 2022 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML22131A351 and ML22192A075, respectively), Virginia Electric and Power Company, (the licensee, Dominion Energy Virginia) submitted a license amendment request (LAR) for the Surry Power Station, Units 1 and 2 (Surry). In its LAR, Dominion Energy Virginia proposed to apply a risk-informed approach to demonstrate that the Fuel Handling Trolley Support Structure (FHTSS), as designed, meets the intent of a tornado resistant structure under the current Surry licensing basis for a 360 miles per hour maximum tornado wind speed.

### 2.0 REGULATORY AUDIT BASIS

A regulatory audit is a planned license or regulation-related activity that includes the examination and evaluation of primarily non-docketed information. The audit is conducted with the intent to gain understanding, to verify information, and to identify information that may require docketing to support the basis of a licensing or regulatory decision. Performing a regulatory audit is expected to assist the U.S. Nuclear Regulatory Commission (NRC) staff in efficiently conducting its review and gaining insights to the licensee's processes, procedures, engineering documentation and calculations related to the LAR. Information that the NRC staff relies upon to make the safety determination must be submitted on the docket. This audit will be conducted in accordance with NRR Office Instruction LIC-111, "Regulatory Audits," Revision 1, dated October 2019 (ML19226A274), with exceptions noted within this audit plan.

The NRC issued construction permits for Surry, Units 1 and 2, before May 21, 1971. Consequently, Surry, Units 1 and 2, were not subject to the requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria [GDC] for Nuclear Power Plants," (see SECY-92-223, "Resolution of Deviations Identified during the Systematic Evaluation Program," ML003763736, dated September 18, 1992.) The conclusion was that Surry, Units 1 and 2, met the intent of the General Design Criteria (GDC) published in 1967 (draft GDCs).

This regulatory audit is based on the following regulatory requirements and guidance:

Section 1.4.2, "Performance Standards," of the Surry Updated Final Safety Analysis Report (UFSAR) describes conformance with Atomic Energy Commission (AEC) Criterion 2 which corresponds to 10 CFR, Part 50, Appendix A, GDC 2, "Environmental and dynamic effects design bases," which states that structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions. The design bases for these structures, systems, and components shall reflect appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena.

Section 14.5.1.2, "Description of Event," of the Surry Updated Final Safety Analysis Report describes conformance with Atomic Energy Commission (AEC) Criterion 4 which corresponds to 10 CFR, Part 50, Appendix A, GDC 4, "Environmental and dynamic effects design bases," which states that structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit.

Regulatory Guide (RG) 1.76, Revision 0, "Design-basis Tornado and Tornado Missiles for Nuclear Power Plants," (ML003740273), states that nuclear power plants must be designed so that they remain in a safe condition under severe meteorological events, including those that could result in the most severe tornado that could reasonably be predicted to occur at the site.

RG 1.174, Revision 3, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," (ML17317A256), documents an approach for developing risk-informed applications for a licensing basis change that considers engineering issues and applies risk insights.

### 3.0 REGULATORY SCOPE AND METHODOLOGY

NRC's objectives of the audit are the following:

- Gain a better understanding of the detailed calculations, analyses, and bases underlying the LAR and confirm the NRC staff's understanding of the LAR.
- Gain a better understanding of plant design features and their implications for the LAR.
- Identify any information needed to enable the staff's evaluation of the technical acceptability of the probabilistic risk assessment (PRA) used for this application.
- Identify any information needed to enable the NRC staff's evaluation of whether the proposed changes challenge design-basis functions or adversely affect the capability or capacity of plant equipment to perform design-basis functions.
- Identify questions and requests that may become formal requests for additional information (RAIs) per NRR Office Instruction LIC-115, "Processing Requests for Additional Information."

The audit team will view the documentation and calculations that provide the technical support for the LAR. The scope of the NRC staff's audit will focus on the following two primary areas/ subjects:

### 3.1 Structural audit areas

1. The engineering assumptions, methodology, industry standards, input variables and related calculations and outputs/results that support the amendment's accountability for the FHTSS change. These documents should present and discuss the additional elements of:
  - a. The cask-drop analysis.
  - b. The fuel handling accident analysis.
  - c. SU-CALC-STR-CE-2085, Revision 0, "Tornado Wind Fragility Analysis of Surry Fuel Handling Trolley Support Structure," dated June 9, 2021.
  - d. NOTEBK-PRA-SPS-RA.LI.016, Revision 0, "Fuel Building Trolley Support Structure Risk Analysis," draft version.
  - e. SU-CALC-STR-CE-2085, Revision 0, Addendum A, "Comparison of the Applied Tornado Wind Loads on the FHTSS with and without Siding," dated March 30, 2022.
  - f. Structural analysis to estimate the median structural capacity of the FHTSS.
  - g. The sensitivity study performed by doubling the composite variability in the fragility curve from 0.175 to 0.35.
  - h. A walkdown of the FHTSS structure and its surroundings.

### 3.2 Risk-informed audit areas

The engineering assumptions, methodology, industry standards, input variables and related calculations and outputs/results that support the amendment's accountability for the FHTSS change.

These documents should present and discuss the additional elements of:

1. A potential radiological release resulting from tornado wind damage to the FHTSS and why it is expected to be bounded by the fuel accidents analyzed under the design basis, including the cask-drop and fuel handling accidents. For this item, the scope of the audit will include:
  - a) The accident scenarios and radiological conditions considered when evaluating a potential radioactive release resulting from tornado wind damage to the FHTSS.

- b) The methodology and results of the analysis demonstrating that a potential radioactive release resulting from tornado wind damage to the FHTSS is bounded by the failure of all 324 fuel assemblies stored in the first three rows of storage racks adjacent to the cask loading area.
  - c) The current design-basis accident analysis of record for the cask-drop and fuel handling accidents.
2. Estimated radiological releases associated with the fuel accidents analyzed under the design basis and why they are expected to be less than the acceptance guidelines for Large Early Release Frequency (LERF) in Regulatory Guide 1.174. For this item, the scope of the audit will include:
- a) The justification and technical basis for comparing consequence-based criteria from design-basis fuel accidents in terms of Total Effective Dose Equivalent (TEDE) (i.e., 6.3 rem TEDE for offsite dose) against the acceptance guidelines for LERF in Regulatory Guide 1.174.
  - b) The estimated releases associated with these accidents.
  - c) The analysis demonstrating the release from the design-basis fuel accidents bounds the acceptance guidelines for LERF.
3. The likelihood of falling members of the FHTSS targeting the spent fuel pool with an angle of attack that can result in localized damage to the spent fuel pool. For this item, the scope of the audit will include:
- a) The basis for only considering single impacts from the heaviest falling members of the FHTSS when evaluating spent fuel pool integrity.
  - b) The methodology and results of the analysis demonstrating the worst-case impact of a single falling member of the FHTSS.
4. Procedures governing the operation of the FHTSS during severe weather conditions, such as tornado watches and warnings, and actions taken specific to the FHTSS under such conditions.
5. The risk to the public from a potential radiological release resulting from tornado wind damage to the FHTSS. For this item, the scope of the audit will include:
- a) The calculation of the spent fuel damage frequency provided in the LAR, including assumptions and justification for the input parameters used, such as the site-specific tornado initiating event frequencies and the tornado wind fragility of the FHTSS such that as stated in the LAR, Section 3.4, that the spent fuel damage is expected to be bounded by the fuel accidents analyzed under the design basis.
  - b) The methodology and results of the analysis demonstrating that the risk to the public from a potential radiological release resulting from tornado wind damage to the FHTSS meets the Commission's safety goals and their quantitative health objectives. An example of an approach that

relates spent fuel damage to the Commission's quantitative health objectives is documented in NUREG 1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," dated January 2001 (ML010430066).

In addition, the audit team may request to discuss these topics with the licensee's subject matter experts and develop (and transmit) focused audit questions for discussion after relevant material is available to the NRC staff via the licensee's electronic reading room.

#### 4.0 INFORMATION AND OTHER MATERIAL NECESSARY FOR THE REGULATORY AUDIT

The NRC staff will request information and an audit meeting(s) throughout the audit period. The NRC staff will use an "audit items list" to identify the information (e.g., methodology, process information, and calculations) to be audited. The NRC staff will provide the final audit items list as an enclosure to the audit summary report, which will be publicly available. The attachment to this audit plan includes the initial audit items list. Throughout the audit period, the NRC staff will provide SNC with audit questions and audit-related requests so that the licensee can better prepare for audit discussions with NRC staff. Any information accessed through the licensee's portal will not be held or retained in any way by NRC staff. The NRC staff requests the licensee to have the requested audit information listed in the audit items list to be readily available and accessible for the NRC staff's review via a Web-based portal.

#### 5.0 AUDIT TEAM

The following are the NRC audit team members:

- Dr. Steven Alferink, Reliability and Risk Analyst, Team Leader ([steven.alferink@nrc.gov](mailto:steven.alferink@nrc.gov))
- Ata Istar, Civil Engineer ([ata.istar@nrc.gov](mailto:ata.istar@nrc.gov))
- De (Wesley) Wu, Reliability and Risk Analyst ([de.wu@nrc.gov](mailto:de.wu@nrc.gov))
- John Klos, Project Manager ([john.klos@nrc.gov](mailto:john.klos@nrc.gov))

#### 6.0 LOGISTICS

The audit will be conducted using video conferencing, an eDocs web portal (also known as an online portal, electronic portal, ePortal, or electronic reading room), and a site audit from October 14 to December 31, 2022. The onsite audit portion of the audit will be in November or December 2022, as coordinated between the licensee and the NRC. During the audit, information may be shared using video conference and telephone conference. The licensee's representatives are requested to be available for video or audio conferences on the audit's scheduled discussion days as they are determined by the NRC licensing project manager and the Surry licensing team. The NRC project manager will coordinate any changes to the audit schedule and locations with the licensee and the NRC staff. The NRC staff would like remote access to the available and related documents listed in Sections 3.0 and 4.0 by October 14, 2022. If this schedule needs to be adjusted, please contact John Klos of the NRC at (301) 415-5136, or via email at [John.Klos@nrc.gov](mailto:John.Klos@nrc.gov).

Audit Schedule

<b>Date</b>	<b>Time</b>	<b>Subject</b>
October 14, 2022	12:00 pm	Audit start date and opening of online portal for review
November or December 2022	TBD	The onsite portion of the audit will be conducted. As part of the onsite portion of the audit, the NRC staff will conduct a walkdown of the FHTSS structure and its surroundings.
November 2, 2022	TBD	Scheduled discussion of portal and site audit items, and any review items of concern
December 31, 2022	12:00 pm	Audit completion date followed by an audit report issuance

7.0 SPECIAL REQUESTS

The following conditions associated with the eDocs web portal must be maintained throughout the duration that the NRC staff have access to the eDocs web portal:

- The eDocs web will be password-protected, and separate passwords will be assigned to the NRC staff who are participating in the audit.
- The eDocs web will be sufficiently secure to prevent the NRC staff from printing, saving, downloading, or collecting any information on the online portal.
- Conditions of use of the eDocs web will be displayed on the login screen and will require acknowledgment by each user.

Username and password information should be provided directly to the NRC staff. The NRC project manager will provide the licensee the names and contact information of the NRC staff who will be participating in the audit. All other communications should be coordinated with the NRC project manager. NRC staff access to the eDocs web portal needs to be terminated 30 days after the end of the regulatory audit.

8.0 DELIVERABLES

The NRC staff will develop any RAIs, as needed, via NRR Office Instruction LIC-115 and issue such RAIs separately from audit-related correspondence. The NRC staff will issue an audit summary report prior to completing its review of the LAR.

SUBJECT: SURRY POWER STATION, UNITS 1 AND 2 – SURRY TORNADO CLASSIFICATION OF THE FUEL HANDLING TROLLEY SUPPORT STRUCTURE LAR AUDIT PLAN (EPID L-2022-LLA-0068) DATED OCTOBER 3, 2022

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DATE	09/06/2022	09/13/2022	09/15/2022
OFFICE	NRR/DRA/APLC/BC(A)*	DORL/LPL2-1/(BC)*	DORL/LPL2-1/PM
NAME	SVasavada	MMarkley	JKlos
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