



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

June 21, 2022

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

SUBJECT: SURRY, UNITS NO. 1 AND 2 – SUPPLEMENTAL INFORMATION NEEDED FOR ACCEPTANCE OF REQUESTED LICENSING ACTION RE: SURRY RISK-INFORMED APPROACH FOR TORNADO CLASSIFICATION OF THE FUEL HANDLING TROLLEY SUPPORT STRUCTURE (EPID L-2022-LLA-0068)

Dear Mr. Stoddard:

By letter dated May 11, 2022, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22131A351), Dominion Energy Virginia submitted a license amendment request (LAR) for Surry Power Station (SPS), Units 1 and 2. The proposed amendment would 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 (i.e., Tornado Criterion "T") under the current SPS licensing basis for a 360 miles per hour (mph) maximum tornado wind speed. The purpose of this letter is to provide the results of the U.S. Nuclear Regulatory Commission (NRC) staff's acceptance review of this amendment request. The acceptance review was performed to determine if there is sufficient technical information in scope and depth to allow the NRC staff to commence its detailed technical review.

Consistent with Section 50.90 of Title 10 of the *Code of Federal Regulations* (10 CFR), an application for an amendment to a license (including the technical specifications) must fully describe the changes requested, and following as far as applicable, the form prescribed for original applications. Section 50.34 of 10 CFR addresses the content of technical information required. This section stipulates that the submittal address the design and operating characteristics, unusual or novel design features, and principal safety considerations.

The NRC staff has reviewed your application and concluded that the information delineated in the enclosure to this letter is necessary to enable the staff to make an independent assessment regarding the acceptability of the proposed amendment in terms of regulatory requirements for the protection of public health and safety and the environment.

In order to make the application complete, the NRC staff requests that Dominion Energy Virginia supplement the application to address the information requested in the enclosure by July 11, 2022. This will enable the NRC staff to begin its detailed technical review. If the information responsive to the NRC staff's request is not received by the above date, the application will not be accepted for review pursuant to 10 CFR 2.101, and the NRC will cease its activities associated with the application. If the application is subsequently accepted for review, you will

be advised of any further information needed to support the staff's detailed technical review by separate correspondence.

The information requested and associated time frame in this letter were discussed with Craig Sly and your staff on June 21, 2022.

If you have any questions, please contact the Surry Project Manager, John Klos, at (301) 415-5136.

Sincerely,

/RA/

John Klos, Project Manager
Plant Licensing Branch 2-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No(s). 50-280 and 50-281

Enclosure:
Supplemental Information Needed

cc: Listserv

SUPPLEMENTAL INFORMATION NEEDED

AMENDMENT REQUEST

DOMINION ENERGY VIRGINIA

SURRY, UNIT NO. 1 AND 2

DOCKET NO(S). 50-280, 50-281

Radiological Risk and Radiological Accident Analysis

In the license amendment request (LAR), the licensee stated that a potential radioactive release resulting from spent fuel damage is expected to be bounded by the fuel accidents analyzed under the design basis, including the cask-drop and fuel handling accidents, because the cask-drop analysis conservatively assumed that all 324 fuel assemblies stored in the first three rows of storage racks adjacent to the cask loading area, under the fuel handling trolley support structure (FHTSS), would fail. The licensee stated that the estimated releases associated with these accidents are less than the release criteria for Large Early Release Frequency (LERF).

In the LAR, the licensee stated that spent fuel pool integrity was evaluated against potential impact loads from falling structural members of the FHTSS. The licensee stated that only single impacts from the heaviest falling members of the FHTSS were considered due to the low likelihood of multiple falling members targeting the spent fuel pool with an angle of attack that can result in localized damage to the spent fuel pool. The licensee stated that falling members from the FHTSS may cause local perforation of the spent fuel pool liner, but no significant leakage is expected because there will be no perforation in the reinforced concrete walls or floor mat of the spent fuel pool.

To support the NRC staff's acceptance review, the licensee is requested to provide the following information in sufficient detail to support the NRC staff's detailed review:

1. A justification for the statement that a potential release resulting from spent fuel damage 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 licensee needs to include: (1) a description of the accident scenarios and radiological conditions considered when evaluating a potential radioactive release resulting from tornado wind damage to the FHTSS and (2) a description of 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.
2. A justification for the statement that the estimated releases associated with the fuel accidents analyzed under the design basis are less than the release criteria for Large Early Release Frequency (LERF). For this item, the licensee needs to include: (1) a 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 release criteria for LERF, (2) a description of the estimated releases associated with these accidents, (3) the release criteria for LERF, and (4) the analysis demonstrating the release from the design-basis fuel accidents bounds the release criteria for LERF.

Enclosure

3. A justification, with analysis, of how the radiological releases described in this amendment are bounded by the current design-basis accident analysis of record for the cask-drop and fuel handling accidents.
4. The current design-basis accident analysis of record for the cask-drop and fuel handling accidents.
5. A description of the methodology and results of the analysis calculating 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 licensee should include a discussion of the decision to consider only single impacts from the heaviest falling members of the spent fuel handling trolley support structure when evaluating spent fuel pool integrity.
6. A description of the methodology and results of the analysis demonstrating the worst-case impact of a single falling member of the FHTSS will not result in perforation in the reinforced concrete walls or the floor mat of the spent fuel pool.
7. A discussion of and results from the evaluation of the baseline risk to the public from a potential radioactive release resulting from tornado wind damage to the FHTSS, assuming the FHTSS met the licensing basis requirements.
8. A discussion of and results from the evaluation of the change in risk to the public from a potential radioactive release resulting from tornado wind damage to the as-built FHTSS.

Regulatory Guide 1.174 Acceptance Guidelines

In the LAR, the licensee stated that they applied the acceptance guidelines in RG 1.174, Revision 3, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," (ADAMS Accession No. ML17317A256) in a similar manner to how the acceptance guidelines were applied in NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," (ADAMS Accession No. ML010430066). NUREG-1738 was prepared to provide a technical basis for decommissioning rulemaking for permanently shutdown nuclear power plants, which is a completely different context from this LAR. Therefore, it is unclear to the NRC staff if the approach described in NUREG-1738 is applicable to an operating reactor such as Surry Power Station. Section 4.1.1 of NUREG-1738 states the following:

For decommissioning plants, the risk is primarily due to the possibility of a zirconium fire involving the spent fuel cladding. The consequences of such an event do not equate directly to either a core damage accident or a large early release as modeled for an operating reactor.

and

Because the changes in Emergency Planning [EP] requirements affect not the frequency of events involving a large early release (i.e., the SFP fire frequency) but the consequences of these releases, the allowable increase in LERF in RG 1.174 is translated into an allowable increase in key risk measures.

These “key risk measures” are provided in Appendix 4D of NUREG-1738 and are frequency of dose to the public including consideration of evacuation. Therefore, the staff is also unclear how the LAR applies the acceptance guidelines in RG 1.174, Revision 3, consistent with NUREG-1738.

In RG 1.174, the NRC staff provides acceptance guidelines for risk-informed LARs in terms of the following common risk metrics: core damage frequency (CDF), LERF, Δ CDF, and Δ LERF. The NRC staff explains that these risk metrics are based on subsidiary objectives derived from the safety goals and their quantitative health objectives (QHOs). The derivation of risk surrogates for light water reactors is contained in NUREG-1860, Appendix D, “Feasibility Study for a Risk-Informed and Performance-Based Regulatory Structure for Future Plant Licensing, Volumes 1 and 2,” December 2007 (ADAMS Accession No. ML080440170).

To support the NRC staff’s acceptance review, the licensee is requested to provide the following information in sufficient detail to support the NRC staff’s detailed review:

1. A discussion of how the proposed change meets all five principles of risk-informed regulation in Regulatory Guide 1.174, Revision 3.
2. A justification for the statement that the proposed approach utilizes the acceptance guidelines in Regulatory Guide 1.174, Revision 3, in a manner similar to how they were applied in NUREG-1738, given the different context and use of frequency of dose to the public as the “key risk measure” in NUREG-1738. For this item, the licensee needs to include: (1) a justification for why the approach described in NUREG-1738, which was prepared to provide a technical basis for decommissioning rulemaking for permanently shutdown nuclear power plants, is applicable to an operating nuclear power plant such as Surry Power Station and (2) a justification for applying the acceptance guidelines in Regulatory Guide 1.174, Revision 3, to this LAR instead of frequency of dose to the public and the QHOs.
3. A discussion of the purpose and basis for developing the Spent Fuel Damage Frequency (SFDF) as a risk metric for this application, given that the NRC has not defined such a risk metric in the context presented in the LAR.
4. A justification for using the SFDF as the appropriate risk metric for this LAR. For this item, the licensee needs to include: (1) a technical basis relating the SFDF to the Commission’s safety goals and their quantitative health objectives and (2) a discussion of the technical and regulatory bases for comparing the SFDF to the acceptance guidelines in Regulatory Guide 1.174, Revision 3, for CDF.

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ADAMS Accession No. ML22166A009

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