



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

March 4, 2019

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

SUBJECT: LICENSE RENEWAL SEVERE ACCIDENT MITIGATION ALTERNATIVES  
AUDIT PLAN REGARDING THE SURRY POWER STATION, UNIT NOS. 1 AND  
2, SUBSEQUENT LICENSE RENEWAL APPLICATION (EPID NO. L-2018-  
RNW-0024)

Dear Mr. Stoddard:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing the Virginia Electric and Power Company's subsequent license renewal application for Surry Power Station, Unit Nos. 1 and 2 (Surry). The NRC staff plans to conduct an in-office audit of new and significant information related to the severe accident mitigation alternatives, beginning March 25, 2019, by teleconference and virtual portal. The audit activities will be conducted in accordance with the audit plan provided at Enclosure 1. The list of audit questions is provided at Enclosure 2.

If you have any questions, please contact me by e-mail at [tam.tran@nrc.gov](mailto:tam.tran@nrc.gov).

Sincerely,

*/RA/*

Tam Tran, Project Manager  
License Renewal Project Branch  
Division of Materials and License Renewal  
Office of Nuclear Reactor Regulation

Docket Nos. 50-280 and 50-281

Enclosures:  
As stated

cc w/encls: Listserv

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 AUDIT PLAN REGARDING THE SURRY POWER STATION, UNIT NOS, 1 AND  
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 RNW-0024) DATED March 4, 2019

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PCooper; RII/DRS

JDozier; NRR/DRA

[tony.banks@dominionenergy.com](mailto:tony.banks@dominionenergy.com)

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OFFICE	PM:MRPB:DMLR	LA:MRPB:DMLR*	BC:MENB:DMLR	PM:MRPB:DMLR
NAME	TTran	SLent	BBeasley	TTran
DATE	2/27/2019	2/14/2019	3/4/2019	3/4/2019

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**LICENSE RENEWAL AUDIT PLAN FOR NEW AND SIGNIFICANT INFORMATION RELATED  
TO THE SEVERE ACCIDENT MITIGATION ALTERNATIVES  
SURRY POWER STATION, UNITS 1 AND 2**

**1. Background**

By letter dated October 15, 2018, Virginia Electric and Power Company (Dominion Energy or the applicant), submitted to the U.S. Nuclear Regulatory Commission (NRC or staff) an application to renew the Surry Power Station, Unit Nos. 1 and 2 (Surry), renewed facility operating licenses DPR-32 and DPR-37. The staff is reviewing the information contained in the environmental report (ER) of the subsequent license renewal application (SLRA) per Title 10 of the *Code of Federal Regulations* Part 51 (10 CFR Part 51).

As part of the staff's review, a severe accident mitigation alternatives (SAMA) audit will be conducted for Surry's SLRA. This audit is conducted with the intent to gain understanding, to verify information, and to identify information that will require docketing to support the basis of the licensing or regulatory decision. Specifically, the NRC staff will identify pertinent SAMA information and data, and obtain clarifications regarding information provided in the ER.

Per NRC guidance, the NRC staff prepares a regulatory audit plan that provides a clear overview of audit activities and scope, team assignments, and schedule.

**2. Audit Bases**

License renewal requirements are specified in 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." Licensees are required by 10 CFR 54.23 to submit an ER that complies with the requirements in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," as part of the LRA. Review guidance for the staff is provided in NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Supplement 1 – Operating License Renewal."

Section 51.53(c)(3)(ii)(L) of 10 CFR states that "If the staff has not previously considered severe accident mitigation alternatives for the applicant's plant in an environmental impact statement or related supplement or in an environmental assessment, a consideration of alternatives to mitigate severe accidents must be provided." Surry provided a SAMA analysis in the 2001 ER for initial license renewal. The ER was reviewed by the NRC in 2003. Thus, the applicant's ER must contain any new and significant information of which the applicant is aware (10 CFR 51.53(c)(iv)) and the NRC staff must consider whether such information affects prior generic environmental determinations, reflected in the Category 1 issues in Table B-1.

**3. Audit Scope**

The scope of the SAMA audit is to review the new and significant evaluation as it relates to the SAMA analysis and results as documented in the Surry SLRA ER and supporting documents.

**4. Information and Other Material Necessary for the Audit**

As described in the list of audit questions (Enclosure 2).

## 5. Team Assignments

Name	Responsibility
J. Dozier	Senior Reliability and Risk Analyst
E. Dickson	Physical Scientist
T. Tran	Project Manager

## 6. Logistics

The regulatory audit will begin as an in-office audit (at NRC HQ using skype and/or Surry online reference portal (Agencywide Documents Access and Management Systems (ADAMS) Accession No. ML18319A252)) on March 25, 2019. Discussions between NRC staff and Dominion Energy staff will be held regarding topics and questions identified in Enclosure 2, "list of audit questions." Entrance and exit briefings will be held at the beginning and end of the in-office audit via conference calls. Status calls during the in-office audit will occur at least weekly, more often if deemed necessary. An exit for this audit will be scheduled at a mutually agreed time for NRC staff and Dominion Energy.

## 7. Special Requests

The NRC staff requests the applicant to make available the license renewal application program basis documentation and other documents as requested for independent searches by the NRC's audit team via the electronic document portal.

## 8. Deliverables

An audit summary report is scheduled to be issued by NRC staff within 90 days from the end of the audit.

**LIST OF AUDIT QUESTIONS  
SURRY POWER STATION UNITS 1 AND 2 (SURRY)  
SUBSEQUENT LICENSE RENEWAL APPLICATION REVIEW  
IN-OFFICE SEVERE ACCIDENT MITIGATION ALTERNATIVES (SAMA) AUDIT**

Specific questions to be discussed during the audit:

1. In the Environmental Report (ER), Dominion indicated that it is following the guidance in Nuclear Energy Institute (NEI) 17-04, "Model SLR New and Significant Assessment Approach for SAMA," Revision 0, for providing SAMA new and significant information. NEI 17-04 specifies, "Further documentation of the new and significant information review is listed in Section 3.5.2." Furthermore NEI 17-04 indicates, "Such documentation should be available to the NRC [U.S. Nuclear Regulatory Commission] either in the SLR [Subsequent License Renewal] ER (at the SLR applicant's discretion), or in supplemental information for review via E-document reading room, audit, and RAIs [requests for additional information]."

Specific additional documentation the staff needs to complete the review relating to SAMA new and significant information include:

- a. List of probabilistic risk assessment (PRA) revisions and the description of changes to the risk models since the 40-to-60-year license renewal application (LRA) (Include a discussion of the changes made at the plant that have reduced or increased risk).
- b. Description of current risk models (at a level of detail consistent with what was expected for the 40-to 60-year LRA).
- c. The comprehensive list and disposition of the Surry candidate SAMAs and industry SAMAs.
- d. The pre-screening criterion used to exclude any of the SAMA candidates from further consideration, including the rationale for any deviations from the screening criteria provided in NEI 17-04. Specifically, in Section E4.15.4.1 of the ER, "Stage 1 Assessment: Step 1 - Identification and Qualitative Screening of SAMAs" Dominion states:

The list of SAMAs collected was evaluated qualitatively to screen from further evaluation any that are not applicable to SPS [Surry Power Station], or that already have been implemented at SPS. In addition, two other screening criteria were applied to eliminate SAMAs that have excessive implementation costs. First, SAMAs were screened from further consideration if they were found to reduce the SPS MB by greater than 50% in the initial SPS license renewal, but also found not to be cost effective due to high estimated costs of implementation in the initial license renewal process. Second, one SAMA (filtered containment vent) was screened due to its excessive implementation cost, because this plant modification has been evaluated by the nuclear industry and explicitly found to not be cost effective in Westinghouse large/dry containments.

Please be prepared to discuss the justification for using these 2 additional screening criteria.

- e. The most recent Probabilistic Safety Analysis (PSA) Peer Review and/or self-assessment reports for all hazards or a summary.
- f. Documentation associated with more recent Surry PSA review, if any.
- g. Any specific Surry references regarding Cost-Benefit Analysis, if available.
- h. NEI 17-04 Section 3.1 "Data Collection" specifies:

"Use the latest risk models that are available for Internal events (including internal flooding) and for each of the external events contributors identified for evaluation in NEI 05-01 ["Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document," Revision A, November 2005]."

NEI 05-01 specifies:

"The IPEEE [Individual Plant Examination of External Events] identified the highest risk externally initiated accident sequences and potential means of reducing the risk posed by those sequences. Typically, the following external events were evaluated:

1. Internal fires
2. Seismic events
3. Other external events such as high wind events, external flooding, transportation and nearby facility accidents"

Explain how "Other external events such as high wind events, external flooding, transportation and nearby facility accidents" were considered in the Surry SAMA New and Significant Evaluation? Discuss recommendations to reduce risk due to each of these external events.

Therefore, if external events were included, the absolute value reduction in MB of some SAMAs would be larger; however, there is confidence that the methodology of percentage reduction in MB due to internal events results in a conservative analysis.

Please be prepared to discuss this further at the audit.

4. Was there any Surry or other facility external event SAMAs evaluated? If so, briefly describe. If not, indicate the reason why not.
5. NEI 17-04 Section 3.1 "Data Collection" specifies that information elements that should be collected and identified as "new" information

for the Stage 1 assessment include plant changes not yet incorporated into plant risk models. Are there any forthcoming model revisions and/or updated modeling techniques that may significantly impact the results of the SAMA evaluation?

6. Describe any Surry power uprates and impacts on risk at Surry. What was the change in CDF and LERF as a result of any power uprate? Was the changes to CDF and LERF less than 30% as a result of power uprate?
7. As provided in the updated 2013 GEIS, peak fuel burnup was considered new information. What is the anticipated peak fuel burnup at Surry?
8. Did Dominion evaluate all of the items in the 2013 GEIS SAMA summary table (including low power, uncertainties, Beir VII)?
9. Page E-4-84 of the ER states:

“As noted above [in the ER], the criterion established for new information being “potentially significant” is if the new information would cause the MB, as defined in Section 4.5 of NEI 05-01 [Rev. A] and calculated for any previously unimplemented, potentially cost beneficial SAMA for SPS to be reduced by a factor of two or more if the SAMA were implemented. If it can be shown that a particular SAMA would not reduce the core damage frequency (CDF) or any of the Level 2 release category frequencies in the model of record by more than a factor of two, then that particular SAMA could not reduce the MB by a factor of more than two. Therefore, that SAMA would not be considered evidence that new and potentially significant information exists, and would not be evaluated further in assessing the significance of new information. This criterion was applied to the SAMA screening evaluation presented in Section E4.15.4.”

Please confirm this statement is equivalent to the NEI 17-04 criteria of demonstrating that SAMA implementation would not reduce the CDF or any of the Level 2 release category frequencies by 50 percent or more. The staff believes that it is the same. No discussion is needed if you confirm that it is the same.

10. TableE4.15-2 of the ER provides the Reduction in Maximum Benefit of Screened-In SAMAs. Please be prepared to discuss these results.
11. Section E4.15.4.3.3 of the ER provides the Economic Inputs for the MACCS codes. Please be prepared to discuss the values obtained specifically for decontamination costs.