

## **NRR-DMPSPeM Resource**

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**From:** Williams, Shawn  
**Sent:** Thursday, April 4, 2019 3:26 PM  
**To:** MOORE, MICHAEL S  
**Cc:** BOUKNIGHT, JUSTIN R ; DALICK, SARA BETH  
**Subject:** Virgil C. Summer Nuclear Station, Unit No. 1 – Request for Additional Information NFPA-805 Program Revisions LAR (EPID No. L-2018-LLA-0233)  
**Attachments:** Summer NFPA LAR RAI 3 4 and 5.docx

Dear Mr. Moore,

By letter dated August 29, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18242A658) South Carolina Electric & Gas Company (SCE&G) submitted a license amendment request for the Virgil C. Summer Nuclear Station, Unit 1, to make changes to its approved fire protection program (FPP) under 10 CFR 50.48(c). In its LAR, the licensee proposed to make several changes to its FPP including changes to plant modifications, use of performance-based alternatives to the requirements of National Fire Protection Association Standard 805 (NFPA-805), Chapter 3, and several clarifications and editorial corrections.

By e-mail dated March 13, 2019 (ADAMS Accession No. ML19072A144), the U.S. Nuclear Regulatory Commission (NRC) provided three requests for additional information (RAI). Regarding PRA RAI No. 3, on March 18, 2019, SCE&G informed the NRC staff that the abeyance seals were credited in the PRA model. Based on this new information, the attached includes a revised PRA RAI No. 3 and two additional RAIs.

During a clarification call on April 4, 2019, Mr. Bouknight, of your staff agreed that SCE&G would respond to PRA RAI No. 3, 4, and 5 within 45 days of the date of this e-mail, which corresponds to approximately May 20, 2019. PRA RAI No. 1 and 2 should continue to be responded by the original agreed 45 days, which corresponds to approximately April 29, 2019.

Please note that the NRC staff's review is continuing and further requests for information may be developed.

If you have any questions, please contact me at 301-415-1009 or [Shawn.Williams@nrc.gov](mailto:Shawn.Williams@nrc.gov).

Sincerely,  
Shawn A. Williams, Senior Project Manager  
Plant Licensing Branch II-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No.: 50-395

Enclosure: Request for Additional Information

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REQUEST FOR ADDITIONAL INFORMATION  
LICENSE AMENDMENT REQUEST TO REVISE  
NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805  
FIRE PROTECTION PROGRAM  
VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1  
DOCKET NO. 50-395

By letter dated August 29, 2018 (Agencywide Document Access and Management System (ADAMS) Package Accession No. ML18242A657), South Carolina Electric and Gas (SCE&G), submitted a license amendment request (LAR) for the Virgil C. Summer Nuclear Station, Unit 1 (VCSNS), to make changes to its approved fire protection program (FPP) under 10 CFR 50.48(c). In its LAR, the licensee proposed to make several changes to its FPP including changes to plant modifications, use of performance-based alternatives to the requirements of NFPA 805, Chapter 3, and several clarifications and editorial corrections.

Regulatory Guide (RG) 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment [PRA] Results for Risk-informed Activities," Revision 2 (ADAMS Accession No. ML090410014), provides guidance for addressing probabilistic risk assessment (PRA) acceptability including addressing the need for the PRA model to represent the as-built, as-operated plant. This regulatory guide provides one approach acceptable to the U.S. Nuclear Regulatory Commission (NRC) for determining the technical acceptability of the PRA model. Regulatory Guide 1.200 endorses, with certain clarifications and qualifications, Addendum A to the American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) RA-Sa-2009, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications" ("PRA Standard"). Section 4.2, "Licensee Submittal Documentation," of RG 1.200 states, in part, that the application should discuss the resolution of the open peer review facts and observations (F&Os) that are applicable to the parts of the PRA required for the application.

By e-mail dated March 13, 2019 (ADAMS Accession No. ML19072A144), the NRC issued three requests for additional information (RAI). Regarding PRA RAI No. 3, on March 18, 2019, SCE&G informed the NRC staff that the abeyance seals were credited in the PRA model. Based on this information, the below contains a revised RAI No. 3 and two additional RAIs based on NRC staff's review of the F&Os.

**PRA RAI 03 (Revised)**

In Enclosure 1, Attachment 1 to the licensee's letter dated August 29, 2018, the licensee stated that PRA refinements were made to the reactor coolant pump (RCP) seal loss of coolant accident (LOCA) model based on the RCP seal upgrades. The LAR is not clear on whether these refinements go beyond those described in the NFPA 805 LAR, as supplemented (Approved in Amendment No. 199 – ADAMS Accession No. ML14287A289).

- a) Describe the PRA refinements to the RCP seal LOCA model and discuss whether the approach was used previously to support the NFWA 805 LAR or in another plant LAR and subsequent amendment and if these changes constitute a PRA upgrade as defined in ASME/ANS RA-Sa-2009, Section 1-5.4, as qualified by RG 1.200, Revision 2. Provide the basis for the conclusion regarding whether the refinements are considered a PRA upgrade.

If the refinements are an upgrade, provide the findings of the peer review(s) performed and associated disposition of the findings as it pertains to the impact on this LAR. Please indicate whether the abeyance seals were credited in the PRA model.

- b) If the abeyance seals were credited in the PRA model, then provide one of the following:
  - i) Describe and justify the PRA methodology used to model the abeyance seals. Describe how crediting the abeyance seals impact the fire PRA results in Table W-3 of LAR Enclosure 1, Attachment 5 (e.g., describe and provide the results of a sensitivity study, including the total transition CDF, LERF,  $\Delta$ CDF, and  $\Delta$ LERF, that does not credit the abeyance seals). OR
  - ii) Alternatively to part (i), provide updated risk results in Table W-3 of LAR Enclosure 1, Attachment 5 that does not credit the abeyance seals in the PRA and discuss how the updated risk results align with the risk acceptance guidelines of RG 1.205. Propose a mechanism that ensures an NRC accepted abeyance seal model is available before incorporation of an abeyance seal into the PRA model used for self-approval of post-transition changes.

#### **PRA RAI 04**

Enclosure 1, Attachment 1, Section 2 of the LAR states the fire PRA (FPRA) was updated for refinements to the internal events PRA (IEPRA). The LAR describes some of these refinements and indicates that a full-scope peer review was performed in June 2016. The LAR is not clear as to whether any refinements were made after the 2016 peer review that could be considered PRA upgrades. Also, the dispositions to F&Os from the 2016 peer review of the IEPRA in LAR Enclosure 1, Attachment 8 indicate additional changes may have been made to the IEPRA since the peer review. Therefore, it is uncertain whether the latest IEPRA incorporated in the FPRA meets the PRA acceptability guidance in RG 1.200, Revision 2. The staff requests the licensee provide the following additional information:

- a) Describe the changes made to the IEPRA since the full-scope peer review conducted in June 2016. This description should be of sufficient detail to determine whether the changes are considered PRA maintenance or PRA upgrades as defined in ASME/ANS RA-Sa-2009, Section 1-5.4, as qualified by RG 1.200, Revision 2. Include in your discussion: (1) any new methodologies (i.e., summarize the original method in the PRA and the new method); (2) changes in scope that impact the significant accident sequences or the significant accident progression sequences; (3) changes in capability that impact the significant accident sequences or the significant accident progression sequences.
- b) For each change described in Part (a) above, indicate whether the change was PRA maintenance or a PRA upgrade, along with justification for this determination.
- c) For each PRA upgrade identified in Part (b) above, either:

- i. Provide the findings of the peer review(s) performed on the upgrade and the disposition of the findings as it pertains to the impact on this LAR. OR,
  - ii. Provide sufficient information for NRC staff to compare the technical adequacy of the analysis to RG 1.200, Revision 2, or provide a bounding or sensitivity evaluation of its effect until a focused-scope peer review can be completed.
- d) Refinements were made to the IEPRA and internal flooding PRA (IFPRA). It is not clear why the risk values (i.e., CDF, LERF) for these hazards in LAR Enclosure 1, Attachment 5 (page 3) are the same as those for the NFPA 805 LAR. Provide updated IEPRA and IFPRA risk values in LAR Attachment 5 or provide clarification as to why these values remain unchanged from the NFPA 805 LAR.

### **PRA RAI 05**

Enclosure 1, Attachment 8 of the LAR provides PRA peer review F&Os and dispositions for the IEPRA and IFPRA. Address the following questions related to the dispositions of the IEPRA F&Os for this LAR:

- a) In F&O 2-18 (associated with supporting requirement, SR, HR-F2 of ASME/ANS RA-Sa-2009), the time window for successful completion of human failure events (HFE) (i.e., time available to perform operator actions) is not based on accident sequence based timings. The F&O provides an example where the operator action to supply alternate AC power (i.e., operator action OA\_AAC\_SBO) is based on “an assumption” rather than an actual accident sequence timing value. The associated disposition addresses this example by stating alternate AC power was designed to be available in 60 minutes and this time was used as the time required to complete the operator action. The disposition does not seem to address the issue identified by the F&O, because the F&O pertains to the time available to perform operator actions (i.e., system time window), while the disposition addresses the time required to complete the operator action (i.e., the time it takes to perform operator action). Also, the disposition only addresses the two examples discussed in the F&O; however, these examples may not necessarily represent all instances of this issue as indicated by the peer review team’s assessment. Lastly, no basis is provided for the following statement in the disposition and it is not clear what is meant by “may be small changes” in that statement:

There may be small changes to the HFE values for these items for the Internal Events model but no impact on Fire PRA.

Considering the observations above, explain why resolution of this F&O has no impact on the FPRA and how this resolution impacts the IEPRA.

- b) In F&O 4-01 (associated with SR SC-A5 of ASME/ANS RA-Sa-2009), the IEPRA utilizes mission times less than 24 hours. The associated disposition states, “[t]he Peer Review team did not fully agree with this approach [(i.e., the approach discussed in the disposition and used in the PRA)] and recommended changing all mission time[s] to 24 hours. If adjustments to mission times are found necessary, the closure of this F&O is not expected to have a significant impact on CDF or LERF.” The licensee’s resolution to this F&O is based on an approach that is disagreed upon by the peer review team, and adjustments to mission times can have a significant impact on basic event failure probabilities and the resulting risk. Therefore, it is not clear how resolution of this F&O is not expected to have a significant impact on risk. Considering the observations above, clearly explain why

resolution of this F&O is not expected to have a significant impact on FPRA risk. For example, describe and provide the results of a sensitivity study (such results should include fire plant total CDF, LERF,  $\Delta$ CDF, and  $\Delta$ LERF in Table W-3 of LAR Enclosure 1, Attachment 5) and discuss how the RG 1.205 risk acceptance guidelines continue to be met.

- c) In F&O 4-05 (associated with SR SC-B4 of ASME/ANS RA-Sa-2009), thermal-hydraulic analyses (e.g., MAAP5 runs) and control room simulation runs were used to support success criteria and PRA assumptions; however, use of simulation runs are questionable for the reasons explained in the F&O. The associated disposition does not address use of simulation runs in development of success criteria and PRA assumptions. Explain how simulation runs were used to support development of success criteria and PRA assumptions. Justify how these simulator runs constitutes a thermal-hydraulic analysis and provides an adequate basis to support its use in development of success criteria and PRA assumptions consistent with ASME/ANS RA-Sa-2009, as qualified by RG 1.200, Revision 2.