

NRR-DRMAPEm Resource

From: Lamb, John
Sent: Thursday, August 8, 2019 8:10 AM
To: Enfinger, Timothy Lee
Subject: RAI - Edwin I. Hatch Nuclear Plant, LAR Regarding Adoption of NFPA 805, Request for Additional Information, EPID L-2018-LLA-0107

Importance: High

Mr. Enfinger:

By letter dated April 4, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18096A936), Southern Nuclear Operating Company (SNC, the licensee) submitted a license amendment request (LAR) for the Edwin I. Hatch Nuclear Plant (HNP), Unit Nos. 1 and 2, to adopt National Fire Protection Association Standard 805 (NFPA 805), "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition (ADAMS Accession No. ML010800360), as incorporated into Title 10 of the Code of Federal Regulations, Part 50, Section 50.48(c). On March 29, 2019 the U.S. Nuclear Regulatory Commission (NRC) staff issued requests for additional information (RAIs) (ADAMS Accession No. ML19088A009) to SNC, and on May 28, 2019, SNC responded to those RAIs (ADAMS Accession No. ML19151A421).

The NRC staff has reviewed the licensee's RAI responses and determined that additional information is required in order to complete the review. The requested additional information is below. The RAIs correlates to "holes" in the draft Safety Evaluation or to information that is needed on the docket. It is expected that the licensee's responses to the RAIs will enable the NRC staff to fill in the holes and complete its evaluation.

On August 7, 2019, a clarifying call was held between NRC and SNC to make sure the questions were understandable and did not contain any proprietary information. The NRC staff made some minor editorial revisions to RAI 08.01, which are incorporated in the enclosure. SNC stated they would respond to the below RAIs within 60 days from the date of this email. In addition, SNC stated that they would respond to NFPA 805 PRA RAI 03 – Integrated Analysis, and NFPA 805 PRA 18 – Impact of a Key Source of Uncertainty on Application, within 120 days from the date of this email.

Enclosed is the request for additional information.

Sincerely,

John G. Lamb, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosure: Request for Additional Information

RAI

By application dated April 4, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18096A936), Southern Nuclear Operating Company (SNC, the licensee) submitted a license amendment request (LAR) for the Edwin I. Hatch Nuclear Plant (HNP), Unit Nos. 1 and 2, to adopt National Fire Protection Association Standard 805 (NFPA 805), "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition (ADAMS Accession No. ML010800360), as incorporated into Title 10 of the Code of Federal Regulations, Part 50, Section 50.48(c). On March 29, 2019 the Nuclear Regulatory Commission (NRC) staff issued requests for additional information (RAIs) (ADAMS Accession No. ML19088A009) to SNC, and on May 28, 2019, SNC responded to those RAIs (ADAMS Accession No. ML19151A421).

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Information included in the RAIs has been reviewed for SUNSI and no information was found of which the loss, misuse, modification, or unauthorized access could reasonably be foreseen to harm the public interest, the commercial or financial interests of the entity or individual to whom the information pertains, the conduct of NRC and Federal programs, or the personal privacy of individuals.

SOUTHERN NUCLEAR OPERATING COMPANY,

EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2

LICENSE AMENDMENT REQUEST TO IMPLEMENT A RISK-INFORMED, PERFORMANCE-

BASED, FIRE PROTECTION PROGRAM AS ALLOWED BY TITLE 10 OF THE CODE OF

FEDERAL REGULATIONS, PARAGRAPH 50.48(c) (EPID L-2018-LLA-0107)

DOCKET NOS. 50-321 AND 50-366

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PRA RAI 05.01 – Update of Fire PRA when Modifications and Implementation are Complete

In its letter dated May 28, 2019, SNC provided updated text for Implementation Item IMP-19 but did not include that same text in LAR Attachment S, Table S-3. The NRC staff requests that SNC update LAR Attachment S, Table S-3 to reflect the wording of the updated Implementation Item IMP-19 provided on page E4-4 of its May 28, 2019 letter.

PRA RAI 07.01 – Treatment of Sensitive Electronics Screening Approach

In its letter dated May 28, 2019, SNC explained that a screening approach was used to preclude internally inspecting each electrical cabinet to determine whether sensitive electronics exist that should be treated using a damage threshold of 3kW/m². SNC explains that based on their function, certain cabinets were excluded

from consideration such as switchgear, motor controlled centers (MCCs), and distribution cabinets, which implies that there are no sensitive electronics associated with switchgear, MCCs, and distribution cabinets; however, SNC did not state this. SNC also explains that “[f]ire risk is already bounded by the fire initiating event treatment (e.g., loss of the panel is bounded by assumed plant trip.” The NRC staff interprets this statement to mean that failure of panels that lead only to a plant trip are already modeled in the fire probabilistic risk assessment (FPRA) as contributing to an initiating event, yet, the NRC staff notes that panels that lead to failures affecting plant shutdown need to be fully modeled to accurately account for their risk. In light of these observations, the NRC staff requests that SNC:

- a) Clearly indicate whether cabinets screened from consideration based on their function such as switchgear, MCCs, and distribution cabinets do not house sensitive electronics. If SNC cannot conclude that these cabinets do not contain sensitive electronics, then justify screening these cabinets from consideration for damage to sensitive electronics. Otherwise adjust the aggregate analysis in response to PRA RAI 03.
- b) Confirm that the panels screened because they are already modeled in the FPRA as contributing to plant trips do not also impact plant shutdown. If this conclusion cannot be reached, then justify screening these cabinets from consideration for damage to sensitive electronics. Otherwise, adjust the aggregate analysis in response to PRA RAI 03.

PRA RAI 08.01 – Consideration of Violations in Determining Influencing Factors

In its letter dated May 28, 2019, SNC discussed violations that have occurred in the Cable Spreading Room (CSR), South East (SE) Corner Pump Room, East Cableway Foyer and SE Stairwell and sought to justify the transient influencing factors assigned to these areas. SNC explained that in the CSR, which was designated by a very low maintenance influencing factor, a single 1.5 foot wood two-by-four was found located between two cable trays. SNC further explained that the CSR is designated a Level A transient combustible area requiring permitting and that combustibles are not left unattended except for short periods of time up to an hour. SNC further stated that the wood was likely inadvertently left behind after completion of maintenance work. The NRC staff notes that violations, although inadvertent, can contribute to fire risk. As SNC points out, use of a very low influencing factor requires that no violations have occurred in a reasonable period. In spite of the Level A transient combustible control requirement stated above, it is not clear to the NRC staff why the discovered existence of the section of the wooden two-by-four is not a violation and would not require assigning a higher maintenance influencing factor to the CSR. Therefore, the NRC staff requests that SNC:

- a) Justify why the discovery of the wooden two-by-four is not a violation that would require assigning a higher maintenance influencing factor to the CSR. If it cannot be justified that the existence of the wood in the CSR cannot lead to a higher influencing factor for the CSR, then assign a higher maintenance influencing factor to the CSR in the aggregate analysis provided in your response to PRA RAI 03.

Additionally, the disposition for the three non-CSR violations appears to imply that a certain criterion in FAQ 12-0064 “Hot Work/Transient Fire Frequency Influence Factors,” (ADAMS Accession No. ML12346A488), is met, though it is not clear from SNC’s RAI response whether the criterion is met. Each of the three dispositions state “Per FAQ 12-0064, a low storage rating is to be used for an area where no combustible/flammable material are stored by practice but where combustibles may be introduced subject to a permitting process.” However, SNC does not directly state that this criterion is met. Also, FAQ 12-0064 indicates that when assigning a low storage or maintenance influencing factor, that either no violations have occurred or a performance monitoring program is in place demonstrating that the administrative control programs are meeting expectations and objectives. In light of these observations, the NRC staff requests that SNC:

- b) Confirm that for the three fire zones (i.e., Fire Zone 2205B - SE Corner Pump Room, Fire Zone 1105 – East Cableway Foyer, and Fire Zone 2103 – SE Stairwell) where the violations cited above have occurred, no combustible/flammable material are stored by practice (though combustibles may be introduced subject to a permitting process).

- c) Given that violations have occurred in Fire Zones 2250B, 1105, and 2103, confirm that a performance monitoring program is in place demonstrating that the administrative control program is meeting expectations and objectives.
- d) If the criteria stipulated in part (b) and (c) above cannot be confirmed to be met then justify the assignment of a low storage and/or maintenance influencing factor for these three fire zones or use higher ratings in the aggregate analysis provided in your response to PRA RAI 03.

PRA RAI 15.b.01 – Change-in-Risk Calculations for Main Control Room (MCR) Abandonment Scenarios

In its letter dated May 28, 2019, SNC stated that change-in-risk calculations for MCR abandonment scenarios are performed in the same manner as other scenarios except that the assumption is made in the compliant plant model that “shutdown is being performed from the alternate shutdown panel.” SNC also stated that failures that challenge this mode of safe shutdown or require a recovery action to mitigate failure that does not occur in the MCR or at a remote shutdown panel (RSP) are considered variances from deterministic requirements (VFDRs). Though the approach to identifying VFDRs for MCR abandonment scenarios is explained, SNC does not explain how the compliant plant is modeled versus how the post-transition plant is modeled. (For non-MCR abandonment scenarios, SNC states that basic events with a VFDR function are set to their nominal values, thus eliminating the VFDR by precluding the fire induced failure.)

SNC states that change-in-risk calculations for MCR abandonment scenarios are performed in the same manner as other scenarios except that:

“The compliant case modeling sets a lower bound limit on the [conditional core damage probability] CCDP to a minimum of 7E-02. This assumed value was justified by using the CCDP of an abandonment scenario due to loss of habitability with no PRA equipment failures. In some instances, this modeling assumption was implemented due to conservatism in the modeling logic for loss of control (LOC) and transferring to the RSP for compliant model scenarios only. In doing so, this assumption has established a quantified 'floor value' for a more accurate change in risk between the compliant case and the variant case. This assumption is considered conservative given the human error probability (HEP) for transferring control to the RSP is approximately 7E-02. No lower bound limits were used for conditional large early release probability (CLERP) in the abandonment compliant cases.”

Based on the above, the reason for conservatively limiting the compliant plant model CCDP in these scenarios to 7E-02 is not clear to the NRC staff. The cited statement appears to indicate that the modeling was performed to compensate for conservatism in the modeling logic for LOC and transferring to the RSP. The SNC response to PRA RAI 13.c shows that CCDP for fires in the MCR or CSR ranges down to 1E-02 which is significantly lower than the proposed limit of 7E-02 used in the compliant plant model. NRC staff notes that conservatism in the compliant plant case can lead to underestimation of the change in-risk.

In light of these observations, the NRC staff request that the licensee address the following:

- a) For MCR abandonment scenarios explain (1) how the post-transition plant is modeled, (2) how the compliant plant is modeled, (3) how the compliant plant modeling is different from the post-transition plant modeling, and (4) how the modeling of the compliant plant has the effect of removing the VFDRs.
- b) Concerning the CCDP limit of 7E-02 used in MCR abandonment scenarios:
 - i. Explain and justify the limit of 7E-02 used in MCR abandonment scenarios to limit the compliant plant model CCDP. Include an explanation for the statement “*this modeling assumption was implemented due to conservatism in the modeling logic for LOC and transferring to the RSP.*”

- ii. Justify that use of the proposed CCDP limit in the compliant plant model does not lead to underestimation of the change in-risk for these scenarios.

PRA RAI 15.d.01 – Credit in the Change-in-Risk Calculation for Modifications

In its letter dated May 28, 2019, SNC does not provide a sufficient explanation to the NRC staff to understand how modifications that do not resolve a VFDR but reduce the risk associated with a VFDR are credited. The response to PRA RAI 15.d stated:

“If the modification is associated with a VFDR, the delta risk calculation eliminates the variance via modification.”

The response further states:

“If the modification does not mitigate a specific VFDR the modification is credited in both the compliant and variant models to estimate the delta risk between the post transition plant and the compliant model.”

The NRC staff notes that it is possible to propose a plant modification that is “associated” with a VFDR but does not fully resolve or mitigate that VFDR which appears to be the case for modification items 8, 9, 10 and 11 because LAR Attachment S, Table S-2 states for these items that “This modification provides an improvement in delta (Δ) core damage frequency (CDF) and Δ large early release frequency (LERF).” Accordingly, it is not clear to the NRC staff whether implementation items 8, 9, 10 and 11 satisfy the first statement above or the second statement. It appears to the NRC staff that the cited implementation items satisfy neither statement since these implementation items do not appear to resolve a VFDR (and thus make the change-in-risk for the VFDR zero) and they do not appear to be credited in both the compliant and variant plant models because LAR Attachment S, Table S-2 states that they provide an improvement in Δ CDF and Δ LERF.

In light of the above, explain how plant modifications modeled in the FPRA are credited in the compliant and post-transition plant models. Include discussion of modifications that resolve VFDRs, modifications that are not associated with a VFDR, and modifications that reduce the change-in-risk but do not fully resolve a VFDR.

PRA RAI 16.01 – Impact of Uncredited Systems on Transition Change-in-Risk

In its letter dated May 28, 2019, SNC responded to PRA RAI 16 and stated that the extent of untraced cables is about 15% of the FPRA components with cables, and that components with untraced cables were treated in the FPRA by globally failing them in the compliant and post-transition plant FPRA models. SNC further explained that a sensitivity study was performed indicating that if these components were credited in the FPRA, there would be approximately a 25% reduction in the total FPRA risk due “largely” to assuming failure of the feedwater system. SNC also explained that no VFDRs are associated with the feedwater system, and therefore, not crediting this system in the FPRA does not contribute to underestimation of the transition change-in-risk. However, SNC did not indicate whether there are any other uncredited components besides the feedwater system that are associated with a VFDR and could contribute to underestimation of the transition change-in-risk. SNC further stated that the impact from uncredited systems is “largely” from the feedwater system but it is not clear to the NRC staff what the term “largely” means (e.g., Does it mean 51% or 99.9% of the impact?) In light of the above, the NRC staff requests that SNC provide the following information:

- a) Explain whether there are any other systems besides the feedwater system associated with a VFDR (i.e., systems that could contribute to underestimation of the transition change-in-risk), and justify that the impact of their exclusion from the FPRA compliant plant model on the transition change-in-risk is inconsequential.
- b) If there are other systems besides the feedwater system associated with a VFDR that could contribute to underestimation of the transition change-in-risk and if this treatment cannot be justified in response to part (a) above, then replace this treatment with a more realistic treatment that does not

underestimate the change-in-risk and provide the results in the integrated analysis requested in PRA RAI 03.

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