NRR-DMPSPEm Resource

From: Kuntz, Robert
Sent: Thursday, January 31, 2019 5:49 AM
To: Loeffler, Richard A.
Subject: Request for Additional Information RE: Monticello License Amendment Request to Adopt 10 CFR 50.69
Attachments: MNGP 50.69 RAI.docx

Mr. Loeffler,

By letter dated March 28, 2018 (ADAMS Accession No. ML18087A323), Northern States Power Company-Minnesota (NSPM or the licensee) doing business as Xcel Energy, submitted a license amendment request (LAR) to adopt 10 CFR 50.69, Risk-informed Categorization and Treatment of Structures, Systems, and Components for Monticello Nuclear Generating Plant (Monticello). Section 3.1.1 of the LAR states that NSPM will implement the risk categorization process in accordance with NEI 00-04, Revision 0, as endorsed by RG 1.201. The NRC staff requests additional information (RAIs) to further assess the proposed adoption of 10 CFR 50.69 at Monticello for consistency with RG 1.200, Revision 2, and NEI 00-04, Revision 0, as endorsed by RG 1.201. Attached is the NRC staff's RAI. As discussed during a clarification call held Monday January 28, 2019, a response is expected to the RAI within 45 days.

Robert Kuntz
Senior Project Manager
NRC/NRR/DORL/LPL-3

Hearing Identifier: NRR_DMPS
Email Number: 783

Mail Envelope Properties (BN6PR09MB15072D256690B55DD621FCAE99910)

Subject: Request for Additional Information RE: Monticello License Amendment Request to Adopt 10 CFR 50.69
Sent Date: 1/31/2019 5:49:23 AM
Received Date: 1/31/2019 5:49:00 AM
From: Kuntz, Robert

Created By: Robert.Kuntz@nrc.gov

Recipients:
"Loeffler, Richard A." <Rick.Loeffler@xenuclear.com>
Tracking Status: None

Post Office: BN6PR09MB1507.namprd09.prod.outlook.com

Files	**Size**	**Date & Time**
MESSAGE	974	1/31/2019 5:49:00 AM
MNGP 50.69 RAI.docx	65363	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

DRAFT REQUEST FOR ADDITIONAL INFORMATION

APPLICATION TO ADOPT 10 CFR 50.69 RISK-INFORMED CATEGORIZATION OF

STRUCTURES, SYSTEMS, AND COMPONENTS

NORTHERN STATES POWER COMPANY

MONTICELLO NUCELAR GENERATING PLANT

DOCKET NO. 50-263

Background

Title 10, of the *Code of Federal Regulations* (10 CFR), Part 50, Section 69, "Risk-Informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors", allows licensees to use a risk-informed process to categorize systems, structures, and components (SSCs) according to their safety significance. For SSCs determined to be of low safety significance (RISC-3 and RISC-4), the regulation allows the relaxation of identified special treatment requirements. Regulatory Guide (RG) 1.201, Revision 1, "Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to their Safety Significance" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML061090627) endorses, with regulatory positions and clarifications, the Nuclear Energy Institute (NEI) guidance document NEI 00-04, Revision 0, "10 CFR 50.69 SSC Categorization Guideline," (ADAMS Accession No. ML052910035) as one acceptable method for use in complying with the requirements in 10 CFR 50.69. Regulatory Guide 1.201, Revision 1, cites RG 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities" as related to assessing the acceptability of a PRA for risk-informed decisionmaking. Revision 2 of Regulatory Guide 1.200 (ADAMS Accession No. ML090410014) endorses industry consensus probabilistic risk assessment (PRA) standards (e.g., the American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS) PRA standard ASME/ANS RA-Sa-2009), both of which are used as the basis for peer reviews to evaluate the acceptability of a PRA.

By letter dated March 28, 2018 (ADAMS Accession No. ML18087A323), Northern States Power Company-Minnesota (NSPM or the licensee) doing business as Xcel Energy, submitted a license amendment request (LAR) to adopt 10 CFR 50.69, Risk-informed Categorization and Treatment of Structures, Systems, and Components for Monticello Nuclear Generating Plant (Monticello). Section 3.1.1 of the LAR states that NSPM will implement the risk categorization process in accordance with NEI 00-04, Revision 0, as endorsed by RG 1.201. The NRC staff requests additional information (RAIs) to further assess the proposed adoption of 10 CFR 50.69 at Monticello for consistency with RG 1.200, Revision 2, and NEI 00-04, Revision 0, as endorsed by RG 1.201.

RAI 01 – Internal Fire PRA F&Os

Section 50.69(c)(i) of 10 CFR requires that a licensee's PRA must be of sufficient quality and level of detail to support the categorization process and must be subjected to a peer review

process assessed against a standard or set of acceptance criteria that is endorsed by the NRC. Section 50.69(b)(2)(iii) of 10 CFR requires that the results of the peer review process conducted to meet 10 CFR 50.69 (c)(1)(i) criteria be submitted as part of the application.

Attachment 3 of the LAR provides Facts and Observations (F&Os) that remain open following the Independent Assessment performed for the internal fire PRA (FPRA). The dispositions of several of these F&Os state that the open F&O has insignificant or no impact on the application, but do not provide sufficient justification. Also, several of dispositions state that, "[t]he Closure Review Team Recommendations will be addressed," and briefly state how the recommendation will be addressed, but do not propose a mechanism to ensure that the PRA update will be performed prior to implementation of the 10 CFR 50.69 program (for example, propose a licensee condition that includes all applicable implementation items and a statement that they will be completed prior to implementation of the 10 CFR 50.69 categorization program). Provide the following information:

a. F&O 2-5: Use of Transient Fire Influencing Factors

For F&O 2-5, the peer review team identified that the influencing factors assigned in the FPRA model were based on engineering judgement and a set of rules documented in Section 5.6.2 of the Ignition Frequency Notebook. The peer review team further stated that the influencing factors assigned resulted in comparatively low values (i.e., averaging much less than 3). In the NRC staff's parallel review of Monticello's proposed adoption of Technical Specifications Task Force (TSTF) Standard Technical Specification (STS) Change TSTF-425, Table 2-1 of the LAR (ADAMS Accession No. ML 17353A189) for the resolution of the F&O 2-5 the Independent Assessment team (i.e., Closure Review team) stated in part, "better justification of application of a 'very low' factor in two compartments [8 and 33] needs to be provided."

The update for treatment of influencing factors for the two fire compartment areas, 8 and 33, which were assigned very low influencing factors, could have an impact on this risk-informed application. Additionally, Frequently Asked Question (FAQ) 12-0064, "Close-Out of National Fire Protection Association 805 Frequently Asked Question 12-0064 on Hot Work/Transient Fire Frequency Influence Factors" (ADAMS Accession No.ML12346A488), provides related guidance for consideration in the use of influencing factors in an FPRA.

EITHER:

i. Provide discussion to support the justification for why the treatment (use of the influencing factors) used in the Monticello FPRA for fire compartments 8 and 33 is appropriate for this application (e.g., explain how the influencing factors used for fire compartments 8 and 33 are consistent with or bounds the guidance in FAQ 12-0064;

OR

ii. Provide the results of a sensitivity study performed to address the impact, and a description of how the conclusion of the sensitivity study considers changes to

the PRA results (e.g., total CDF, total LERF, importance measures) used in the 10 CFR 50.69 categorization process).

OR

iii. Alternatively, propose a mechanism to ensure the activities and changes associated with F&O 2-5 will be completed, appropriately reviewed, and any issues resolved prior to implementation of 10 CFR 50.69 categorization process. Additionally, this mechanism should specify how the F&O 2-5 will be resolved in the PRA at Capability Category (CC) II for the applicable Supporting Requirements (SRs) and include any additional finding-level F&O(s) identified as a result of performing a potential peer review (i.e., resolution of the F&O that may involve an upgrade). An example mechanism would be a table of listed implementation items referenced in a license condition.

b. F&O 3-6: Fire-Induced Failures

The disposition to F&O 3-6 states that the F&O Independent Assessment team found about ten components that should be treated as failed in a fire that were not treated as such in the FPRA model. The disposition to F&O 3-6 also states, "[t]he Closure Review Team Recommendation will be addressed by including the specified basic events in the fire failed events flag file."

The disposition does not explain how Monticello will ensure that the cited basic events will be added to the fire-failed events flag file, prior to implementation of the 10 CFR 50.69 program. The licensee further states in the LAR, a sensitivity study was performed that demonstrates exclusion of the cited fire-induced failures has only a small effect on core damage frequency (CDF) and large early release frequency (LERF). It is not clear to the NRC staff how the sensitivity study performed concluded that the excluded fire-induced failures would have an insignificant impact on the categorization of SSCs associated with specific systems. Considering these observations:

EITHER

i. Provide discussion to support the justification that the exclusion of all applicable basic events from the fire-failed events flag file has no impact on the PRA results used to support risk-informed categorization.

OR

ii. Provide the results of a sensitivity study performed to address the impact, and a description of how the conclusion of the sensitivity study considers changes to the PRA results (e.g., total CDF, total LERF, importance measures) used in the 10 CFR 50.69 categorization process.

OR

iii. Alternatively, propose a mechanism that ensures F&O 3-6 will be resolved prior to implementation of the 10 CFR 50.69 categorization process. This mechanism should also provide an explicit description of the changes that will be made to the PRA model or documentation to resolve this issue and include any additional

finding-level F&O(s) identified as a result of performing a potential peer review that may be determined necessary for resolution of the F&O (i.e., involve an upgrade). An example mechanism would be a table of listed implementation items referenced in a license condition.

c. F&O 4-11: 20 degrees Celsius (C) Ambient Air Assumption

For F&O 4-11 the peer review team identified that using an initial ambient air temperature of 20 degrees C in fire models is not appropriate for fire zones that are not temperature controlled such as the Diesel Generator Building, and areas of the Reactor Building. The disposition to F&O 4-11 states in part, "[t]he Closure Review Team recommendation will be addressed by revising the fire models using expected plant ambient temperatures for each fire zone."

The disposition does not explain how Monticello will ensure that the FPRA model will be updated using expected plant ambient temperatures that are bounding temperatures to account for days when the outdoor temperature is high prior to implementation of the 10 CFR 50.69 program. Considering these observations:

EITHER:

i. Provide discussion to support the justification that the initial ambient air temperatures for fire modeling has no adverse impact (does not mask/skew the importance measures of other SSCs) or no impact on the PRA results used to support risk-informed categorization.

OR

ii. Alternatively, propose a mechanism that ensures F&O 4-11 will be resolved at CC II for the applicable SR(s) prior to implementation of the 10 CFR 50.69 categorization process. This mechanism should also provide an explicit description of changes that will be made to the PRA model or documentation to resolve this issue and include any additional finding-level F&O(s) identified as a result of performing a potential peer review that may be determined necessary for resolution of the F&O (i.e., involve an upgrade). An example mechanism would be a table of listed implementation items referenced in a license condition.

d. F&O 4-20: Treatment of Sensitive Electronics

For the resolution of F&O 4-20, the Independent Assessment team states in part, additional verification and documentation of the main control board configuration for sensitive electronics was determined to be required to fully resolve this F&O. The licensee's disposition to the F&O states that addressing the F&O closure team's recommendation is not expected to have any impact on CDF or LERF since the recommendations are associated with documentation changes to better explain modeling rationale. Verification is not a documentation issue when configurations are potentially identified that result in modelling changes to the PRA that could impact the application. Considering these observations:

EITHER:

i. Confirm that the guidance in FAQ 13-0004 (ADAMS Accession No. ML13182A708) has been fully implemented for all fire zones addressed in the FPRA model, including for the main control room, (i.e., complete the verification);

OR

ii. If the guidance in FAQ 13-0004 was not fully implemented, provide justification that addresses why this incomplete treatment (deviation) does not impact the 10 CFR 50.69 application. Include in the justification a description of the proposed alternate treatment, applicable fire zones, and the associated impact to the 10 CFR 50.69 categorization process.

OR

iii. Provide the results of a sensitivity study performed to address the impact, and a description of how the conclusion of the sensitivity study considers changes to the PRA results (e.g., total CDF, total LERF, importance measures) used in the 10 CFR 50.69 categorization process).

OR

iv. Alternatively, propose a mechanism that ensures F&O 4-20 will be resolved at CC II for the applicable SRs prior to implementation of the 10 CFR 50.69 categorization process. This mechanism should also provide an explicit description of changes that will be made to the PRA model and/or documentation to resolve this issue and include any additional finding-level F&O(s) identified as a result of performing a potential peer review that may be determined necessary for resolution of the F&O (i.e., involve an upgrade). An example mechanism would be a table of listed implementation items referenced in a license condition.

e. F&O 4-33: Wall and Corner Effects Using FLASH-CAT

For the resolution to F&O 4-33 the Independent Assessment Team states in part, the results may not be bounding for cable trays in wall or wall-corner locations and verification that FLASH-CAT results were not used for such configurations needs to be performed. It is not clear to the NRC staff how the fire scenarios that need detailed fire modelling in the FPRA model are determined (i.e., considered) and the overall impact on the PRA results used to support risk-informed categorization. Considering these observations:

i. Provide discussion to support justification that the current fire modeling practices that do not consider detailed fire modelling is bounding to the as-built, as-operated plant and has no adverse impact (does not mask/skew the importance measures of other SSCs) or no impact on the PRA results used to support the 10 CFR 50.69 risk-informed categorization.

OR

ii. Provide the results of a sensitivity study performed to address the impact, and a description of how the conclusion of the sensitivity study considers changes to

the PRA results (e.g., total CDF, total LERF, importance measures) used in the 10 CFR 50.69 categorization process).

OR

iii. Alternatively, propose a mechanism that ensures F&O 4-33 will be resolved at CC II for the associated SR(s) prior to implementation of the 10 CFR 50.69 categorization process. This mechanism should also provide an explicit description of changes that will be made to the PRA model and/or documentation to resolve this issue and include any additional finding-level F&O(s) identified as a result of performing a potential peer review that may be determined necessary for resolution of the F&O (i.e., involve an upgrade). An example mechanism would be a table of listed implementation items referenced in a license condition.

f. Resolutions of Identified F&Os

A number of recommended actions specified by the Independent Assessment team for F&O closure were identified and provided in Attachment 3 of the LAR that have not been corrected in the PRA model and/or associated documentation proposed to be used in the 10 CFR 50.69 categorization process. The resolutions are associated with F&Os 6-3, 6-9, 6-11, and 7-3. For the disposition of all these F&Os, the licensee states that the corrections are not expected to have a significant impact on total CDF or LERF, and the effect of the individual and the cumulative changes to the PRA on the PRA results to support risk-informed categorization.

Considering these observations, propose a mechanism to ensure that all the corrections related to F&Os 6-3, 6-9, 6-11, and 7-3, will be resolved at CC II for the applicable SR(s) and incorporated into the FPRA model and/or documentation prior to implementation of the 10 CFR 50.69 program. This mechanism should also provide an explicit description of the changes that will be made to the PRA model(s) and/or documentation to resolve this issue and include any additional finding-level F&O(s) identified as a result of performing a potential peer review that may be determined necessary for resolution of the F&O (i.e., involve an upgrade). An example mechanism would be a table of listed implementation items referenced in a license condition.

g. F&O 7-4: Logic Associated With Fire-induced Openings of Safety Relief Valves (SRVs)

In Attachment 3 of the LAR, the F&O resolution states in part, the F&O finding closure review team identified additional locations in the model where the revised logic model still needs to be added to fully account for fire-induced SRV opening scenarios. The disposition to F&O 7-4 states, “[t]he Closure Review Team recommendation will be addressed by performing thermal hydraulic MAAP analysis to determine the success criteria for the opening of two or more SRVs. The fault tree model will be revised to reflect the determined success criteria.” Considering these observations:

EITHER:

i. Provide discussion to support the justification that the success criteria given two or more open SRVs has no adverse impact (does not mask/skew the importance

measures of other SSCs) and/or no impact on the PRA results used to support the 10 CFR 50.69 categorization process.

OR

ii. Provide the results of a sensitivity study performed to address the impact, and a description of how the conclusion of the sensitivity study considers changes to the PRA results (e.g., total CDF, total LERF, importance measures) used in the 10 CFR 50.69 categorization process).

OR

iii. Propose a mechanism that ensures F&O 7-4 will be resolved at CC II for the applicable SRs prior to implementation of the 10 CFR 50.69 categorization process. This mechanism should also provide an explicit description of the changes that will be made to the PRA model(s) and/or documentation to resolve this issue and include any additional finding-level F&O(s) identified as a result of performing a potential peer review that may be determined necessary for resolution of the F&O (i.e., involve an upgrade). An example mechanism would be a table of listed implementation items referenced in a license condition.

h. F&O FO-1– Exclusion of Credit Associated with Ventilation-Limited Burning

For F&O FO-1 the resolution states in part, the F&O finding closure review team identified issues with the sensitivity study case and its applicability in certain situations. Additional justification concerning the treatment of the ventilation-limited modeling for those areas needs to be developed. The disposition states [t]he Closure Review Team recommendation will be addressed by reviewing the cable heat soak fire modeling that credits ventilation limited burning and credit for ventilation limited burning will be removed.

It is not clear to the NRC staff that removing credit for ventilation-limited burning from the cable heat soak fire models would have an adverse and/or insignificant impact on the PRA results used to support risk-informed categorization (e.g., mask the importance measures for other SSCs). Considering these observations:

EITHER

i. Provide justification to support that removal of the credit for ventilation-limited burning in the cable heat soak models has no adverse impact (does not mask/skew the importance measures of other SSCs) and/or no impact on the PRA results used to support risk-informed categorization.

OR

ii. Provide the results of a sensitivity study performed to address the impact, and a description of how the conclusion of the sensitivity study considers changes to the PRA results (e.g., total CDF, total LERF, importance measures) used in the 10 CFR 50.69 categorization process).

OR

iii. Alternatively, propose a mechanism that ensures F&O FO-1 will be resolved prior to implementation of the 10 CFR 50.69 categorization process. This mechanism should also provide an explicit description of changes that will be made to the PRA model or documentation to resolve this issue and include any additional finding-level F&O(s) identified as a result of performing a potential peer review that may be determined necessary for resolution of the F&O (i.e., involve an upgrade). An example mechanism would be a table of listed implementation items referenced in a license condition.

RAI 02 – Identified Key Assumptions and Sources of Uncertainties

Paragraphs 50.69(c)(1)(i) and (ii) of 10 CFR require that a licensee's PRA be of sufficient quality and level of detail to support the SSC categorization process, and that all aspects of the integrated, systematic process used to characterize SSC importance must reasonably reflect the current plant configuration and operating practices, and applicable plant and industry operational experience. The guidance in NEI 00-04 specifies sensitivity studies to be conducted for each PRA model to address uncertainty. The sensitivity studies are performed to ensure that assumptions and sources of uncertainty (e.g., human error, common cause failure, and maintenance probabilities) do not mask the SSC(s) importance. Regulatory Guide 1.174, Revision 3, cites NUREG-1855, Revision 1, as related guidance. In Section B of RG 1.174, Revision 3, the guidance acknowledges specific revisions of NUREG-1855 to include changes associated with expanding the discussion of uncertainties.

In Section 4.1 of the LAR, Monticello identifies RG 1.174, Revision 3, as an applicable regulatory requirement/criteria. Contrary to Section 4.1 of the LAR, Section 3.2.7 of the LAR states that guidance in NUREG-1855, Revision 0, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decisionmaking," and Electric Power Research Institute (EPRI) TR-1016737, "Treatment of Parameter and Modeling Uncertainty for Probabilistic Risk Assessments," was used to identify, characterize, and screen model uncertainties. Attachment 6 of the LAR identifies five assumptions and sources of uncertainty applicable to either the IEPRA (includes internal flood) or FPRA models.

NUREG-1855 has been updated to Revision 1 as of March 2017 (ADAMS Accession No. ML17062A466). The NRC staff notes that NUREG-1855, Revision 1, provides guidance in stages A through E for how to treat uncertainties associated with PRA models in risk-informed decisionmaking. Revision 1 of NUREG-1855 cites EPRI TR-1026511, "Practical Guidance on the Use of Probabilistic Risk Assessment in Risk-Informed Applications with a Focus on the Treatment of Uncertainty." Considering these observations provide the following:

a. A detailed summary of the process used to identify the key assumptions and sources of uncertainty presented in Attachment 6 of the LAR. The discussion should include:

   i. How the process is consistent with NUREG-1855, Revision 1, or other NRC-accepted methods (e.g., NUREG-1855, Revision 0). If deviating from the current guidance provided in NUREG-1855, Revision 1, provide a basis to justify the appropriateness of any deviations for use in the 10 CFR 50.69 categorization process (e.g., exclusion/consideration of EPRI TR-1026511).

   ii. A brief description of how the key assumptions and sources of uncertainties provided in Attachment 6 of the LAR were identified from the initial comprehensive list of PRA model(s) (i.e., base model) uncertainties and

assumptions, including those associated with plant-specific features, modeling choices, and generic industry concerns. This can include an identification of the sources of plant-specific and applicable generic modeling uncertainties identified in the uncertainty analyses for the base IEPRA (includes internal flood) and the base FPRA and include a disposition for each of the assumptions and/or uncertainties addressing their impact for the 10 CR 50.69 risk application. For any source of uncertainty or assumption judged not to be key to the application, provide discussion for why it is not pertinent to the application and therefore does not need to be addressed (i.e., sensitivity studies performed).

b. If the process used to identify, characterize, and assess the key assumption(s) and the treatment for the sources of uncertainty provided in Attachment 6 of the LAR cannot be justified for use in the 50.69 categorization process, provide the results of an updated assessment of the key assumptions, sources of uncertainty, and treatment of the sources of uncertainty performed in accordance with NUREG-1855, Revision 1, and NEI 00-04, Revision 0. For the treatment of the sources of uncertainty (e.g., sensitivity studies to be performed) include a detailed description of the sensitivity study and how the sensitivity study is bounding to address the specific key assumption and/or source of uncertainty.

RAI 03 - Dispositions of Key Assumptions and Sources of Uncertainties

Paragraph 50.69(c)(1)(i) of 10 CFR requires the licensee to consider the results and insights from the PRA during categorization. The guidance in NEI 00-04 specifies sensitivity studies to be conducted for each PRA model to address uncertainty. The sensitivity studies are performed to ensure that assumptions and sources of uncertainty (e.g., human error, common cause failure, and maintenance probabilities) do not mask importance of components. NEI 00-04 guidance states that additional “applicable sensitivity studies” from characterization of PRA adequacy should be considered.

The guidance in NEI 00-04 specifies sensitivity studies to be conducted for each PRA model to address sources of uncertainty. The sensitivity studies are performed to ensure that assumptions and sources of uncertainty (e.g., human error, common cause failure, and maintenance probabilities) do not mask importance of components. NEI 00-04 guidance states that applicable sensitivity studies from characterization of PRA adequacy should be considered. For the sources of uncertainty provided in Attachment 6 of the LAR the dispositions do not discuss the specific treatment (e.g., sensitivity study) that will be performed to address the source of uncertainty and/or provide in the disposition a conclusion for why the impact of the source of uncertainty is not adverse and/or insignificant to the risk application.

- Ignition counting in the FPRA model
- Fire cable selection for the FPRA model
- Heat release rates specified in NUREG/CR-6850 for the FPRA model

Considering the NRC staff observations, for each of the above sources of uncertainty identified, provide the following:

EITHER:

a. Provide discussion to justify why the source of uncertainty is not adverse and or insignificant to the risk application, and therefore does not need to be addressed (i.e., sensitivity study performed) for the application.

OR

b. Provide the quantitative results of a sensitivity study and/or justification that supports the conclusion that the source of uncertainty has no adverse impact (i.e., mask/skew the importance measures for other SSCs) and/or insignificant impact on the 10 CFR 50.69 categorization process. Include in the justification (1) a description of the sensitivity study that was performed for the FPRA, (2) how it considered the potential to mask/ skew the importance of certain SSCs, and (3) how the sensitivity study performed bounds the source of uncertainty being addressed.

c. Describe which of the sensitivity studies outlined in Section 5 of NEI 00-04 is directly applicable for this key assumption. Describe how the sensitivity study will be performed and include justification that addresses (1) why the sensitivity study bounds the source of uncertainty being addressed and (2) how the potential to mask/skew the importance measures of other SSCs is considered.

OR

d. If justification and/or a sensitivity study cannot be provided in parts (a), (b), or (c) to confirm that the source of uncertainty is not adverse and/or insignificant to the 10 CFR 50.69 risk application, then propose a mechanism to address (e.g., eliminate) the source of modelling uncertainty in the FPRA model prior to implementation of the 10 CFR 50.69 risk application. This mechanism should also provide an explicit description of changes that will be made to the PRA model(s) and/or documentation to resolve this issue and include any additional finding-level F&O(s) identified as a result of performing a potential peer review that may be determined to be necessary for resolution of the F&O (i.e., involve an upgrade). An example mechanism would be a table of listed implementation items referenced in a license condition.

RAI 04 – Qualitative Function Categorization

NEI 00-04, Section 9.2.2, "Review of Safety Related Low Safety-Significant Functions/SSCs," states in part, in making their assessment, the IDP should consider the impact of loss of the function/SSC against the remaining capability to perform the basic safety functions. This section also provides seven questions that should be considered for making the final determination of the safety-significance for each system function/SSC. In Table 3-1 of the LAR, the intersection of the column labeled “IDP Changes from Preliminary HSS to LSS” and the row labeled “Qualitative Criteria” states that the IDP can change HSS to LSS. It is unclear from the LAR how the IDP will collectively assess these seven specific questions.

a. Clarify the IDP will collectively assess the seven specific questions to identify a function/SSC as LSS as opposed to HSS. For example, a function/SSC is considered HSS when the answer to any one question is false.

b. If the criteria provided in part (a) considers more than one question is false for the IDP to assign a category of HSS to an SSC, provide justification to support rationale for why this is appropriate to use in the 10 CFR 50.69 risk-informed application.

RAI 05 – SSCs Categorization Based on Other External Hazards

Sections 50.69(c)(1)(ii) of 10 CFR require that the licensee determine SSC functional importance using an integrated, systematic process for addressing initiating events (internal and external), SSCs, and plant operating modes, including those not modeled in the plant-specific PRA.

LAR Section 3.2.4 states in part, "[a]ll other hazards (i.e., not seismic or fire hazards) were screened from applicability to Monticello per a plant-specific evaluation in accordance with GL-88-20, supplement 4, and updated to use the criteria in ASME PRA Standard RA-Sa-2009." This statement appears to indicate that Monticello proposes to treat all SSCs as LSS with respect to other external events. However, the LAR also states that "[a]s part of the categorization assessment of other external hazard risk, an evaluation is performed to determine if there are components being categorized that participate in screened scenarios and whose failure would result in an unscreened scenario." The two cited statements from the LAR seem to be in conflict. Attachments 4 and 5 of the LAR provide a summary of the other external hazards screening results, but does not appear to address any considerations related to applying Figure 5-6 of NEI 00-04 guidance to those hazards. Considering these observations:

a. Identify the external hazards that will be evaluated according to the flow chart in NEI 00-04, Section 5.4, Figure 5-6. Provide detailed justification for screening external hazards (i.e., external flood, high winds, and tornados) using the criteria in Part 6 of ASME/ANS RA-Sa-2009. As applicable, the justification should include consideration of uncertainties in the determination of demonstrably conservative mean values as discussed in Section 6.2-3 of ASME/ANS RA-Sa-2009.

   i. Provide justification for the conclusion provided in Attachment 5 of the LAR for criterion PS1, that the external flood, high winds, and tornados hazard(s) cannot cause a core damage accident.

   ii. Attachment 4, External Hazards Screening, of the LAR states that recent evaluation of the external flood hazard performed in response to the post-Fukushima 50.54(f), request for information indicated that risk from river flood is bounded by the current licensing basis and local intense precipitation does not challenge safety systems. Section 3.1.1 of the LAR also states that for these reasons the external flood hazard was screened out. An NRC staff assessment of Monticello's evaluation of the external flood hazard at Monticello dated April 12, 2016 (ADAMS Accession No. ML18081A948) refers to passive and active plant features that are credited to mitigate flood damage. For the external flood hazard, provide detailed justification for concluding that the current licensing basis and local intense precipitation is bounding (i.e., external flood hazard CDF is less than 1×10^{-6} per reactor-year).

   iii. Attachment 4 of the LAR states that wind damage is bounded by damage caused by tornadoes. Attachment 4 of the LAR also states that tornado wind speed corresponding to an exceedance frequency of 1×10^{-6} per year is less than the wind speed that plant structures were designed to and therefore screening category PS4 (CDF less than 1×10^{-6} per year) is met, and damage due to the forces associated with extreme wind or tornadoes can be screened. However, this rational for screening tornadoes does not take into consideration the possibility of tornado missiles. The NRC staff notes that tornadoes with higher

exceedance frequencies than 1×10^{-6} per year (corresponding to lower wind speeds) can generate missiles which can potentially damage plant equipment that supports safe plant shutdown. Also, the LAR does not provide a basis or justification for the CDF associated with tornadoes missiles is 1.1×10^{-7} per year. Provide detailed justification for concluding that for the high winds and tornados hazard, the mean frequency is less than 1×10^{-5} per reactor-year and the mean conditional core damage probability is less than 0.1.

b. Figure 5-6 of NEI 00-04 shows that if an SSC is included in a screened scenario(s), then for that SSC to be considered a candidate LSS, the licensee has to show that if the component was removed, the screened scenario(s) would not become unscreened.

   i. Identify and justify what type of SSCs, if any, are credited in the screening of the external hazard(s), including both passive, active, and temporary features.

   ii. If there are any SSCs credited for screening of the external hazard(s), then explain and justify how the guidance in Figure 5-6 of NEI 00-04 will be applied for each of the external hazard(s).

c. If the external hazards (i.e., external flood, high winds and tornados) cannot be screened out in item (a), discuss, using quantitative or qualitative assessments, how the risk from those hazards will be considered in the categorization program. The discussion should include consideration of and, as applicable, the basis for the following factors:

   - The frequency of the external hazard(s),
   - The impact of the external hazard(s) on plant SSCs and plant's operation including the ability to respond to the external hazard initiating event,
   - The operating experience associated with reliability of the external hazard(s) protection measures (e.g., flood seals), and
   - The reliability of operator actions.

RAI 06 – Incorporation of FLEX Into the PRA Model(s)

There are several challenges to incorporating FLEX strategies into PRA models that need to be addressed. The NRC memorandum dated May 30, 2017, "Assessment of the Nuclear Energy Institute 16-06, 'Crediting Mitigating Strategies in Risk-Informed Decision Making,' Guidance for Risk-Informed Changes to Plants Licensing Basis" (ADAMS Accession No. ML17031A269), provides the NRC's staff assessment of challenges to incorporating FLEX equipment and strategies into a PRA model in support of risk-informed decision making in accordance with the guidance of RG 1.200.

a. State whether FLEX equipment and strategies have been credited in the PRA. If their inclusion is not expected to impact the PRA results used in the categorization process provide brief statement to confirm the PRA results are not impacted. If not incorporated no additional response is requested.

b. If the equipment or strategies have been credited, and their inclusion is expected to impact the PRA results used in the categorization process please provide the following

information separately for the IEPRA, FPRA, external hazards PRA(s), and external hazards screening as appropriate:

i. A discussion detailing the extent of incorporation, i.e., summarize the supplemental equipment and compensatory actions, including FLEX strategies that have been quantitatively credited for each of the PRA models used to support this application.

ii. A discussion detailing the methodology used to assess the failure probabilities of any modeled equipment credited in the licensee's mitigating strategies (i.e., FLEX). The discussion should include a justification explaining the rational for parameter values, and whether the uncertainties associated with the parameter values are considered in accordance with ASME/ANS RA-Sa-2009, as endorsed by RG 1.200, Revision 2.

iii. A discussion detailing the methodology used to assess operator actions related to FLEX equipment and the licensee personnel that perform these actions. The discussion should include:

- A summary of how the impact of the plant-specific human error probabilities and associated scenario-specific performance shaping factors listed in (a)-(j) of supporting requirement HR-G3 of ASME/ANS RA-Sa-2009 are evaluated.

- Whether maintenance procedures for the portable equipment were reviewed for possible pre-initiator human failures that renders the equipment unavailable during an event, and if the probabilities of the pre-initiator human failure events were assessed as described in HLR-HR-D of ASME/ANS RA-Sa-2009.

- If the procedures governing the initiation or entry into mitigating strategies are ambiguous, vague, or not explicit, a discussion detailing the technical bases for probability of failure to initiate mitigating strategies.

iv. ASME/ANS RA-Sa-2009 defines PRA upgrade as the incorporation into a PRA model of a new methodology or significant changes in scope or capability that impact the significant accident sequences or the significant accident progression sequences. Section 1-5 of Part 1 of ASME/ANS RA-Sa-2009 states that upgrades of a PRA shall receive a peer review in accordance with the requirements specified in the peer review section of each respective part of ASME/ANS RA-Sa-2009.

1. Provide an evaluation of the model changes associated with incorporating mitigating strategies, which demonstrates that none of the following criteria is satisfied: (1) use of new methodology, (2) change in scope that impacts the significant accident sequences or the significant accident progression sequences, (3) change in capability that impacts the significant accident sequences or the significant accident progression sequences, OR

2. Propose a mechanism to ensure that a focused-scope peer review is performed on the model changes associated with incorporating mitigating

strategies, and associated F&Os are resolved to Capability Category II prior to implementation of the 10 CFR 50.69 categorization program. An example mechanism would be a table of listed implementation items referenced in a license condition.

RAI 07 – Proposed License Condition

The guidance in NEI 00-04 allows licensees to implement different approaches, depending on the scope of their PRA (e.g., the approach if a seismic margins analyses is relied upon is different and more limiting than the approach if a seismic PRA is used). RG 1.201, Revision 1, states that "as part of the NRC's review and approval of a licensee's or applicant's application requesting to implement 10 CFR 50.69, the NRC staff intends to impose a license condition that will explicitly address the scope of the PRA and non-PRA methods used in the licensee's categorization approach."

Section 2.3 of the LAR proposed the following License Condition:

> *NSPM is approved to implement 10 CFR 50.69 using the processes for categorization of Risk-Informed Safety Class (RISC)-1, RISC-2, RISC-3 and RISC-4 structures, systems and components specified in the license amendment request dated March 28, 2018.*
>
> *Prior NRC approval, under 10 CFR 50.90, is required for a change to the categorization process specified above (e.g., change from a seismic margins approach to a seismic probabilistic risk assessment approach).*

The proposed license condition does not explicitly address the PRA and non-PRA approaches that were used. Provide a license condition that explicitly address the approaches, e.g.:

> NSPM is approved to implement 10 CFR 50.69 using the processes for categorization of Risk Informed Safety Class (RISC)-1, RISC-2, RISC-3, and RISC-4 structures, systems, and components (SSCs) using: Probabilistic Risk Assessment (PRA) models to evaluate risk associated with internal events, including internal flood, internal fire, external flood, and high winds; the shutdown safety assessment process to assess shutdown risk; the Arkansas Nuclear One, Unit 2 (AN0-2) passive categorization method to assess passive component risk for Class 2 and Class 3 SSCs and their associated supports; and the results of non-PRA evaluations that are based on other external hazards using the IPEEE Screening Assessment for External Hazards, and seismic margin analysis (SMA) used to evaluate seismic risk; as specified in License Amendment No. [XXX] dated [XXXX].
>
> Prior NRC approval, under 10 CFR 50.90, is required for a change to the categorization process specified above (e.g., change from a seismic margins approach to a seismic probabilistic risk assessment approach).

Note that if implementation items are identified, the license condition will need to be expanded to address them.

RAI 08 – Integrated One-Top PRA Hazards Model

NEI 00-04, Section 5.6, "Integral Assessment," discusses the need for an integrated computation using the available importance measures. It further states in part, that the

"integrated importance measure essentially weights the importance from each risk contributor (e.g., internal events, fire, and seismic PRAs) by the fraction of the total core damage frequency [or large early release frequency] contributed by that contributor." The guidance provides formulas to compute the integrated Fussell-Vesely (FV), and integrated Risk Achievement Worth (RAW).

To address the integration of importance measures, some licensees have updated their PRA model to a one-top model that integrates the PRA model(s) across all hazards (i.e., internal events, internal flood, internal fire, seismic, high winds, external flood).

To confirm that the importance measures generated for use in the 10 CFR 50.69 process is consistent with the NEI guidance and does not inadvertently introduce a deviation from the computations for FV and RAW provided in the NEI 00-04 guidance, as endorsed by RG 1.201, Revision 1:

a. Explain whether the PRA model that will be used in the 10 CFR 50.69 categorization process is an integrated one-top model across multiple PRA hazards and if the integrated one-top model includes accident sequence(s) modeling to support quantification of both CDF and LERF. If using an integrated one-top model across multiple PRA hazards for the 50.69 categorization process, provide the following:

   i. Discuss the process used to validate and confirm the integration of the PRA hazards into a one-top model to ensure that after the PRA model change was performed, SRs QU-F2 and SR FQ-F1 continue to be met (e.g., cut set reviews, identification of non-minimal cut sets, peer review).

   ii. Discuss how the individual importance measures (i.e., FV and RAW) for the PRA one-top all hazards model are derived from the one-top model, and justify why the importance measures generated do not deviate from the NEI guidance. If the practice or method used to generate the integrated importance measures is determined to deviate from the NEI guidance, justify why the integrated importance measures computed are appropriate for use in the categorization process.

RAI 09 – Implementation Items

Attachment 3, "Disposition and Resolution of Open Peer Review Findings and Self-Assessment Open Items from Facts and Observation Closure Review Process," of the LAR provides dispositions for the self-assessment open items and the remaining open F&Os from the peer reviews of the IEPRA (includes internal flood) and FPRA that were not closed by the August and October 2018 Independent Assessments performed for F&O closure. Several of the dispositions for the F&Os and/or open items (i.e., 2-1, 3-6, 4-11, 4-33, 6-3, 6-9, 6-11, 7-3, 7-4, and FO-1) state in part, "[t]he closure review team recommendations will be addressed."

Propose a mechanism that ensures these activities and changes will be resolved prior to implementing the categorization process. This mechanism should also include additional actions identified in response to RAIs 01.a through 01.h and specify, how the F&Os and open items will be resolved in the PRA. An example would be a table of listed implementation items referenced in a license condition.

As an alternative to providing an implementation item for an F&O or open item, please demonstrate that the F&O will have no adverse impact or insignificant impact on the 10 CFR 50.69 categorization process.