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ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Monticello Nuclear Generating Plant
Docket No. 50-263
Renewed Facility Operating License No. DPR-22

Response to Request for Additional Information (RAI) Related to License Amendment Request to Implement Technical Specifications Task Force Traveler TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b," Monticello Nuclear Generating Plant (EPID L-2020-LLA-0062)

References:

1) Letter (L-MT-20-003) from NSPM to the NRC, "License Amendment Request: Revise Technical Specifications to Adopt Risk-informed Completion Times TSTF-505, Revision 2, 'Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b,'" dated March 30, 2020 (ADAMS Accession No. ML20090F820)

2) Technical Specification Task Force (TSTF) Traveler, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b" (TSTF-505-A, Revision 2), dated November 26, 2018

3) Letter (L-MT-20-036) from NSPM to the NRC, "Response to Request for Additional Information Related to License Amendment Request to Implement Technical Specification Task Force Traveler TSTF-505, Revision 2, "Provide Risk-informed Extended Completion Times – RITSTF Initiative 4b" (EPID L-2020-LLA-0062), dated December 21, 2020 (ADAMS Accession No. ML20356A131)

4) Email from the NRC to NSPM, "Monticello TSTF-505, Request for Additional Information," dated March 9, 2021 (ADAMS Accession No.ML21068A277)

In Reference 1, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), submitted a license amendment request to the Technical Specifications (TS) for the Monticello Nuclear Generating Plant (MNGP). The proposed amendment would modify TS requirements to permit the use of Risk-Informed Completion Times in accordance with TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion

Times – RITSTF Initiative 4b" (Reference 2). NSPM provided information in Reference 3. The NRC identified the need for additional information in Reference 4. The enclosure to this letter provides NSPM's response to Reference 4.

The information provided in this letter does not alter the evaluations performed in accordance with 10 CFR 50.92 in Reference 1.

NSPM is notifying the State of Minnesota of this request by transmitting a copy of this letter and enclosure to the designated State Official.

Please contact Mr. Ron Jacobson at 612-330-6542 or ronald.g.jacobson@xcelenergy.com if there are any questions or if additional information is needed.

Summary of Commitments

This letter makes no new commitments and no revisions to existing commitments.

I declare under penalty of perjury, that the foregoing is true and correct.
Executed on April 20, 2021.

Thomas A. Conboy
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
Resident Inspector, Monticello, USNRC
State of Minnesota

ENCLOSURE

**RESPONSE TO
REQUEST FOR ADDITIONAL INFORMATION (RAI)
RELATED TO LICENSE AMENDMENT REQUEST
TO IMPLEMENT TECHNICAL SPECIFICATIONS TASK FORCE TRAVELER
TSTF-505, REVISION 2,
"PROVIDE RISK-INFORMED EXTENDED COMPLETION TIMES – RITSTF INITIATIVE 4B"
MONTICELLO NUCLEAR GENERATING PLANT**

1.0 BACKGROUND

In Reference 1, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), submitted a license amendment request (LAR) to the Technical Specifications (TS) for the Monticello Nuclear Generating Plant (MNGP). The proposed amendment would modify TS requirements to permit the use of Risk-Informed Completion Times (RICTs) in accordance with TSTF-505, Revision 2, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b" (Reference 2). NSPM provided information in Reference 3. The NRC identified the need for additional information in Reference 4.

2.0 RESPONSES TO REQUEST FOR ADDITIONAL INFORMATION

RAI 4.b.01 – PRA Model Update Process

Section 2.3.4 of NEI 06-09, "Risk-Managed Technical Specifications (RMTS) Guidelines" (ADAMS Accession No. ML12286A322), specifies "Criteria shall exist in PRA configuration risk management to require PRA model updates concurrent with implementation of facility changes that significantly impact RICT calculations."

In RAI 4 the NRC staff requested a description of the criteria that would be used to require an unscheduled PRA update, and how the impact on the RICT program is considered when reviewing plant changes or conditions for implementation in the PRA.

The response to RAI 4 stated the RICT impact assessment of PRA changes will be conducted on a quarterly basis by assembling and quantifying the latest living PRA model files. The response states that an interim model update occurs if “certain cumulative thresholds (e.g., Mitigating System Performance Index (MSPI) Birnbaum, delta CDF/LERF)” are met or if a significant impact to a PRA application is predicted. The response further explain that significant impact is defined as all hazards total core damage frequency (CDF) or large early release frequency (LERF) risk values change by more than twenty-five percent. The RAI response does not explain how the impact on RICT is considered when deciding whether an interim model update is necessary. The NRC staff notes that small increases in baseline CDF or LERF, for individual hazards PRA or total combined all hazards PRA, could translate into a large impact on RICT estimates when equipment is taken out of service.

a) Provide clarification on the additional quantitative criteria, other than the twenty-five percent change in total CDF or LERF, used when deciding whether an interim PRA model

update is necessary. Include in this discussion justification how these proposed quantitative criteria ensure that no significant impact on RICT estimates occurs prior to reaching these thresholds.

b) Discuss any additional considerations (e.g., qualitative), used to assess the impact on RICT estimates when deciding whether an interim PRA model update is necessary.

NSPM Response:

a) As documented in Enclosure 7 of the LAR (Reference 1) and response to RAI 4 (Reference 3), the probabilistic risk assessment (PRA) model maintenance and update procedure specifies that a review of cumulative changes between the model of record (MOR) and the living model be performed on a quarterly basis by performing an assembly and quantification of the living model. The quantification includes evaluation of the impact on each separate hazard model (i.e., internal events including internal flooding and internal fire) and all hazards. If the quantitative review predicts the PRA results for an individual or all-hazard model will be impacted by greater than +/-25% for CDF or LERF, then an application specific model or MOR is published and the affected application is updated. If the +/-25% for CDF or LERF criteria is exceeded, then entrance into RICTs is suspended until corrected, except when the deviation is such that impacted RICTs remain conservative. Since RICT estimate changes cannot be directly correlated to an absolute value change in CDF or LERF, the qualitative measures described in the response to 4.b.01.b below, are used to inform the impact on the RICT estimates.

b) The impact of PRA model changes on RICT estimates is addressed qualitatively in two ways:
   1) As documented in RAI 9.c, when a plant modification, enhancement or PRA model error has been identified that may have a model impact, the change is assessed to determine its impact on regulatory applications, including RICT. If it is not practical to assess the risk impact quantitatively, then a qualitative assessment, utilizing the experience and judgement of the PRA engineer, is performed considering the potential change in basic event importance measures for each application.
   2) The quarterly quantification report includes a qualitative review of open PRA model change items with risk levels that had not immediately resulted in the development of a PRA model update. This assessment utilizes the experience and judgement of the PRA engineer to determine if there are any issues that are individually small but could collectively impact one of the existing PRA applications.

   In both qualitative assessments, the impact on RICT is evaluated and a determination made as to whether a PRA model update is necessary. Information that supports these assessments is documented in accordance with the process requirements and then reviewed by another PRA engineer.

RAI 9.01 – PRA Model Uncertainty Analysis Process

The NRC staff safety evaluation to NEI 06-09 specifies that the LAR should identify key assumptions and sources of uncertainty and licensees should assess and disposition each as to their impact on the RMTS application. Section 2.3.4 of NEI 06-09 states that PRA modeling uncertainties shall be considered in application of the PRA base model results to the RICT program. It states that sensitivity studies should be performed on the base model prior to initial implementation of the RICT program on uncertainties which could potentially impact the results of a RICT calculation. It also states that the insights from the sensitivity studies should be used to develop appropriate risk management actions (RMAs), including highlighting risk significant operator actions, confirming availability and operability of important standby equipment, and assessing the presence of severe or unusual environmental conditions.

The response to RAI 9 stated that the specific criterion in assessing some sources of uncertainty, as demonstrated in the response to RAI 9.d, is an estimation of the change in risk associated with the uncertainty being qualitatively evaluated as negligible.

The response to RAI 9.d regarding the uncertainty related to rupture of containment with the loss of containment heat removal (CHR) provided an updated sensitivity study that resulted in an increase of twelve and twenty percent in risk for CDF and LERF, respectively. The response evaluated that the risk increase is primarily associated with the control rod drive (CRD) injection due to other failure modes and since the CRD components are not included in the RICT program that this uncertainty would not impact any RICT calculations. The NRC staff notes that although the CRD may not have an associated LCO in scope of the RICT program, other RICTs may be impacted. The response did not demonstrate that this potential source of uncertainty does not have an impact on any RICT calculations.

The response regarding the uncertainty related to reactor core isolation cooling (RCIC) availability after battery depletion provided results of a sensitivity study in which the failure of this operation was tripled. The study appeared to have a small impact on overall risk and demonstrated minimal impact for several RICTs, however it appears to have a larger impact on the RICT estimates for LCO 3.3.5.1.B and 3.8.4.B, of twelve and twenty-five percent, respectively.

Address the following:

a) Provide justification, such as a sensitivity study, that the source of uncertainty regarding loss of CHR resulting in containment failure does not constitute a key assumption or source of uncertainty. If determined to be key, then provide adequate disposition of this uncertainty for the RICT application. Consistent with the guidance in NEI 06-09-A, this disposition can include discussion of risk management actions (RMAs).

b) Similarly, it appears that the assumption regarding RCIC operation after battery depletion could constitute a key assumption or source of uncertainty for some RICTs. Provide further disposition of this uncertainty for the RICT application. Consistent with the guidance in NEI 06 09 A, this disposition can include discussion of RMAs.

c) The response to RAI 9.a states that a total of 33 candidate sources of uncertainty were evaluated for their effects on the calculation of RICTs. The response further details some of the criteria used: uncertainties are qualitatively shown to have a “very small” impact on total risk, and would be expected to have a “negligible impact” on delta-CDF and delta-LERF, or uncertainties are represented through conservative PRA modeling and demonstrate a “negligible impact” on delta-risk RICT calculations.

It’s not clear to the staff that the process described in the response to RAI 9.a and b ensures that key assumptions and sources of uncertainty are adequately addressed. The qualifiers of “very small” and “negligible impact” appears to be key to the appropriate disposition of the PRA assumptions and uncertainties for the RICT application. However, some sources of uncertainty discussed in response to RAI 9.d appeared to have an impact on RICT that are large enough to merit further evaluation. While RMAs may or may not be necessary, assessment of these impacts should be documented.

Discuss how the items of “negligible impact” are considered when addressing impact on the RICT program. Provide confirmation that all key assumptions and sources of uncertainty are and will be identified, appropriately examined, and adequately addressed for the RICT program.

NSPM Response:

a) As documented in the response to RAI 9.d (Reference 3), the updated sensitivity study regarding potential loss of CHR resulted in a significant reduction in the impact on CDF and LERF as compared to the original study documented in the MNGP PRA Uncertainty Notebook. The updated study included a small amount of non-conservatism in the PRA because it assumed that no gradual containment overpressurization scenarios would result in a rupture of containment. To address this non-conservatism the PRA model to be used for MNGP RICT calculations will be updated to reflect the Individual Plant Examination (IPE) assessment of containment failure mechanisms for gradual overpressurization scenarios.

Since non-rupture leakage remains the dominant failure mode as pressure slowly rises to the mean containment failure pressure, the new modeling treatment results in a small reduction in the RICT estimates for eight of the 41 LCOs eligible for RICT application. Therefore, consistent with NEI 06-09-A, the potential loss of CHR resulting in containment failure is not a key source of uncertainty for the RICT program. With the change in the PRA modeling, no RMAs are required. The model update has been added as an implementation item (Attachment 1, Revised Table A5-1, Item 8).

b) The operator actions to operate the RCIC pump following battery depletion are proceduralized actions. Specifically, they are incorporated into the plant’s Emergency Operating Procedures (EOPs) using pre-staged equipment and operators are trained in the performance of this action. The calculation of the human error probability (HEP) for this action is based on industry-standard methods that are applied within their range of

applicability, and the human reliability analysis considered the time available to perform the action, the stress levels involved, and the availability of written procedures.

Although the sensitivity study results documented in RAI 9.d response indicate that the PRA model retains some sensitivity to the value of the HEP used in the model for RCIC operation following battery depletion, the HEP used for RCIC operation under such conditions is not a source of uncertainty due to the modeling standard and conservative approach used. No RMAs are required.

c) As documented in the response to RAI 9, four basic considerations were used to determine if candidate uncertainties were relevant to the RICT application. One of those considerations concluded that the candidates that relied on an industry consensus model were not uncertainties. Another consideration utilized quantitative sensitivity analysis to determine the impacts of the candidate on calculated RICTs. The remaining two considerations qualitatively evaluated the characteristics of each candidate uncertainty with respect to the RICT program.

Application of these qualitative evaluation considerations was documented by experienced PRA engineers whose qualification and knowledge of the PRA models as well as knowledge of the as-built, as operated plant provide confirmation that all candidate assumptions and sources of uncertainty were identified, appropriately examined, and adequately addressed for the RICT program.

The overall process used to evaluate the candidate uncertainties that were dispositioned under the two qualitative considerations is summarized below:

1) Determine if the current PRA model had addressed the uncertainty, thereby removing the candidate as a source of uncertainty.

2) Determine the impacts of the candidate uncertainty on the systems, procedures, and scenarios involved. This resulted in some candidate uncertainties being dispositioned based on the candidate having a negligible impact on system or plant response considering, for example, expected system flow rates, heat removal capacities, and maximum expected flow diversions.

3) Determine the possible impacts on specific initiating events and component failure modes of concern if the candidate uncertainty is applicable based on expected system or plant operation through a review of the all-hazards PRA results to identify those that would have negligible impacts on CDF and LERF. This review is performed by PRA engineers, considering such factors as the frequencies and conditional core damage probabilities for initiating events as well as Fussell-Vesely, Risk Achievement Worth and Risk Reduction Worth importance measures for specific failures or appropriate surrogate events. The evaluations specifically consider the impact on the delta-risk calculations that are used to establish the RICT values.

> The PRA update process identifies, examines, and adequately addresses key assumptions and sources of uncertainty for the RICT program.

RAI 14.b.01 – PRA Modeling

Regulatory Position 2.3.3 of RG 1.174 states that the level of detail in the PRA should be sufficient to model the impact of the proposed licensing basis change. The characterization of the change should include establishing a cause-effect relationship to identify portions of the PRA affected by the change being evaluated. Full-scale applications of the PRA should reflect this cause-effect relationship in a quantification of the impact of the proposed licensing basis change on the PRA elements.

The NRC staff's safety evaluation for NEI 06-09 specifies that the LAR should provide a comparison of the TS functions to the PRA modeled functions and that justification be provided to show that the scope of the PRA model is consistent with the licensing basis assumptions.

Regarding unmodeled SSCs, the evaluation states the following:

> NEI 06-09, Revision 0, specifically applies the RMTS only to those SSCs which mitigate core damage or large early releases. Where the SSC is not modeled in the PRA, and its impact cannot otherwise be quantified using conservative or bounding approaches, the RMTS are not applicable, and the existing front stop CT would apply.

Further, Item 11 in Section 2.3 of TSTF-505, Revision 2, states:

> The traveler will not modify Required Actions for systems that do not affect core damage frequency (CDF) or large early release frequency (LERF) or for which a RICT cannot be quantitatively determined.

Regarding TS LCO 3.7.2.A for emergency service water (ESW) system, the LAR states that ESW is not required to prevent CDF and LERF. In RAI 14.b the NRC staff asked the licensee to justify inclusion of TS LCO 3.7.2.A in the scope of the RICT program. In response to RAI 14.b the licensee stated that ESW provides cooling to the main control room emergency filtration train, emergency core cooling system (ECCS) room coolers, and ECCS pump motor cooling. It further states that a hydraulic analysis determined that no heating, ventilation, and air conditioning systems (HVAC) were required in meeting the PRA mission time of twenty-four hours and therefore HVAC could be excluded from the PRA model. The response however does not appear to justify screening out ESW for pump motor cooling. The NRC staff notes that pump motor cooling is usually related to pump seals and bearings and it is unclear how the HVAC analysis addresses these components. In light of these observations:

a) Describe and justify the analysis performed to address pump motor cooling requirements, such as pump seals and bearings, and how it was determined that the loss of pump

cooling is not required for the twenty-four-hour PRA mission time. Include in this discussion whether this model exclusion has been peer reviewed.

b) Provide justification why not crediting ESW for ECCS pump motor cooling is not a key assumption or source of uncertainty that could impact the RICT estimates for this system

NSPM response:

a) A review of the previous analysis used to screen out the emergency service water (ESW) system from the MNGP PRA model was performed. The review of the analysis concluded that the control room cooling function was adequately evaluated using a GOTHIC analysis that concluded that explicit modeling of the control room cooling function in the PRA was not required. However, the review of screening criteria for the ESW system concluded that the existing analysis for screening ECCS room/pump motor cooling was inadequate and further analysis is required to justify screening the equipment from the PRA model.

In lieu of performing additional analysis, NSPM has added ECCS room/pump motor cooling to the PRA model used for sample RICT calculations. The addition resulted in essentially no change to the number of days allowed in the sample RICT calculations for all LCOs with the exception of 3.5.1.E which decreased from 27 to 23 days. LCO 3.7.2.A remained at the 30-day backstop. The modeling of the ECCS room/pump motor cooling has been added as an implementation item (Attachment 1, Revised Table A5-1, Item 9).

b) Since modeling of the ECCS room and pump motor cooling has been added as an implementation item, the pump motor cooling is not a key assumption or source of uncertainty.

3.0 REFERENCES

1. Letter (L-MT-20-003) from NSPM to the NRC, "License Amendment Request: Revise Technical Specifications to Adopt Risk-Informed Completion Times TSTF-505, Revision 2, 'Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b,'" dated March 30, 2020 (ADAMS Accession No. ML20090F820)

2. Technical Specification Task Force (TSTF) Traveler, "Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b" (TSTF-505-A, Revision 2), dated November 26, 2018

3. Letter (L-MT-20-036) from NSPM to the NRC, "Response to Request for Additional Information Related to License Amendment Request to Implement Technical Specification Task Force Traveler TSTF-505, Revision 2, "Provide Risk-informed Extended Completion Times – RITSTF Initiative 4b" (EPID L-2020-LLA-0062), dated December 21, 2020 (ADAMS Accession No. ML 2020356A131)

4. Email from the NRC to NSPM, "Monticello TSTF-505, Request for Additional Information," dated March 9, 2021 (ADAMS Accession No.ML21068A277)

ATTACHMENT 1

MONTICELLO NUCLEAR GENERATING PLANT

Response to Request for Additional Information Related to
License Amendment Request to
Implement Technical Specification Task Force Traveler TSTF-505, Revision 2,
"Provide Risk-Informed Extended Completion Times – RITSTF Initiative 4b"

Revised RICT Program PRA Implementation Items

(1 Page Follows)

Revised RICT Program PRA Implementation Items

Revised Table A5-1

Table A5-1 provided with the LAR has been updated to reflect changes due to specific RAI responses in the preceding sections of the Enclosure. Changes from the version included in the LAR have been identified by change bars.

Table A5-1: RICT Program PRA Implementation Items

No.	Implementation Items
1.	NSPM shall ensure that Reactor Protection System RPS Instrumentation is modeled in the MNGP PRA with sufficient detail to accurately calculate a RICT prior to implementation of the RICT Program.
2.	NSPM shall ensure that Mechanical Vacuum Pump system and isolation instrumentation are modeled in the MNGP PRA with sufficient detail to accurately calculate a RICT prior to implementation of the RICT Program.
3.	NSPM shall ensure that the Automatic Depressurization System (ADS) and instrumentation is modeled in the MNGP PRA with sufficient detail to accurately calculate a RICT prior to implementation of the RICT Program.
4.	NSPM shall ensure that the L- 41 AC panel is modeled in the MNGP Fire PRA with sufficient detail to accurately calculate a RICT prior to implementation of the RICT Program.
5.	NSPM shall ensure that the Standby Liquid Control (SBLC) System is modeled with sufficient detail in the MNGP Fire PRA to accurately calculate a RICT prior to implementation of the RICT Program.
6.	NSPM shall ensure the PRA success criteria for Drywell vacuum breakers are clear in the MNGP PRA to accurately calculate a RICT prior to implementation of the RICT Program.
7.	NSPM shall ensure that appropriate joint HEP is used in the MNGP PRA to accurately calculate a RICT prior to implementation of the RICT Program.
8.	NSPM shall ensure that an overpressure containment rupture probability is added to the PRA consistent with the IPE failure mechanisms for gradual overpressurization events.
9.	NSPM shall ensure that ECCS room/pump motor cooling are modeled in the MNGP PRA with sufficient detail to accurately calculate a RICT prior to implementation of the RICT Program.