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L-PI-18-051
10 CFR 50.90

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

Prairie Island Nuclear Generating Plant, Units 1 and 2
Docket Nos. 50-282 and 50-306
Renewed Facility Operating License Nos. DPR-42 and DPR-60

Response to Request for Additional Information: Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program (EPID: L-2018-LLA-0065)

References:

1. Letter from NSPM to NRC Document Control Desk, "License Amendment Request: Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program", dated March 15, 2018 (ADAMS Accession No. ML18074A308)
2. Email from NRC to NSPM, "Request for Additional Information RE: Prairie Island TSTF-425 License Amendment Request", dated August 23, 2018 (ADAMS Accession No. ML18235A298)

Pursuant to 10 CFR 50.90, Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, requested to amend the Renewed Facility Operating Licenses DPR-42 and DPR-60 for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2 (Reference 1). Specifically, the proposed amendment would modify the PINGP Technical Specifications (TS) by relocating specific surveillance frequencies to a licensee-controlled program. On August 23, 2018, the NRC provided Requests for Additional Information (RAIs) (Reference 2) to support the staff's review of the Reference 1 application. The enclosure to this letter provides NSPM's response to the NRC RAIs.

The NSPM responses to the RAIs do not change the conclusions of the proposed No Significant Hazards Consideration and the Environmental Considerations evaluations provided in Reference 1.

Please contact Sara Scott, Licensing Manager, at 612-330-6698, if additional information or clarification is required.

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 September 17, 2018.

A handwritten signature in cursive script that reads "Scott Sharp".

Scott Sharp
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Prairie Island Nuclear Generating Plant, USNRC
Resident Inspector, Prairie Island Nuclear Generating Plant, USNRC
State of Minnesota

**Response to Request for Additional Information:
Application for Technical Specification Change Regarding Risk-Informed Justification
for the Relocation of Specific Surveillance Frequency Requirements to a Licensee
Controlled Program**

1.0 Background

Pursuant to 10 CFR 50.90, Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, requested to amend the Renewed Facility Operating Licenses DPR-42 and DPR-60 for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2 (Reference 1). Specifically, the proposed amendment would modify the PINGP Technical Specifications (TS) by relocating specific surveillance frequencies to a licensee-controlled program. On August 23, 2018, the NRC provided Requests for Additional Information (RAIs) (Reference 2) to support the staff's review of the Reference 1 application. The NSPM responses to the NRC RAIs are provided below.

2.0 Responses to Requests for Additional Information

NRC Question 1:

Attachment 2 to the license amendment request, Section 2.3, "Applicability of Peer Review Findings and Observations (F&Os)," states that a findings closure review was conducted in October 2017 in accordance with Appendix X (ADAMS Accession No. ML17086A451) to NEI 05-04. The Nuclear Regulatory Commission (NRC) has not officially endorsed the guidance in Appendix X; however, is permitting licensees to use the guidance on an interim basis subject to conditions of acceptance outlined in NRC's letter to Nuclear Energy Institute dated May 3, 2017 (ADAMS Accession No. ML17079A427). Provide the following information to confirm that the October 2017 closure review was performed consistent with the NRC accepted process, as discussed in the May 3, 2017 letter:

- a) *Clarify whether a focused-scope peer review was performed concurrently with the F&O closure process. If so, provide the following:*
 - i. *Summary of the scope of the peer review.*
 - ii. *Detailed descriptions of any new F&Os generated from the peer review and the associated dispositions for the application.*

NSPM Response:

The F&O closure review performed in October 2017 on the PINGP Internal Events and Fire PRAs did not include a concurrent focused-scope peer review. Independent of the October closure review, a focused-scope peer review of the PINGP Fire PRA was completed in January 2018 (Reference 1, Attachment 2, Sections 2.3.1 and 2.3.2).

- b) *Confirm that the closure review team was provided with a written assessment and justification of whether the resolution of each F&O, within the scope of the independent assessment, constitutes a probabilistic risk assessment (PRA) upgrade or maintenance update, as defined in American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) RA-Sa-2009, "Addenda to ASME/ANS RA-S-2008, Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," as qualified by Regulatory Guide (RG) 1.200, Revision 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," (ADAMS Accession No. ML090410014). If the written assessment and justification for the determination of each F&O was not performed and reviewed by the F&O closure review team, provide all the finding-level F&Os and the dispositions of these F&Os as it pertains to the impact on the TSTF-425 application. Alternatively, perform an Independent Assessment F&O closure review consistent with Appendix X, as accepted, with conditions, by the NRC letter dated May 3, 2017, and provide any additional open F&Os and associated dispositions as a result of this review.*

NSPM Response:

For both the PINGP Internal Events and Fire PRAs F&O closure reviews, written assessment and justification documents, called F&O resolution roadmaps, were developed by NSPM and reviewed by the F&O closure review team. The purpose of the roadmap documents was to facilitate a constructive F&O closure Independent Assessment using NEI 05-04/07-12, Appendix X. The roadmap documents provided the information as defined under "Pre-Review Activities" in NEI 05-04/07-12, Appendix X, including a written assessment and justification of whether each finding constituted a PRA upgrade or maintenance update as defined in the ASME/ANS PRA standard.

- c) *Appendix X, Section X.1.3 includes five criteria for selecting members of the closure review team. Describe how the selection of members for the October 2017 independent assessment met the five criteria.*

NSPM Response:

The five criteria for F&O closure assessment review team members presented in Appendix X, Section X.1.3, are discussed separately below:

1. Appendix X: Every member of the independent assessment team should be independent of the PRA associated with the F&Os being reviewed, per the criteria of "independent" in the ASME/ANS PRA Standard. These members may be contractors, utility personnel, or employees of other utilities, and may include members of peer review teams that previously reviewed the models being assessed.

Response:

The PINGP Internal Events PRA finding closure assessment team consisted of four contracted PRA engineers. None of these team members had involvement in the development of the Internal Events PRA that was reviewed.

The PINGP Fire PRA finding closure assessment team consisted of eleven contracted PRA and Fire Protection engineers, which included the four contracted PRA engineers who also supported the Internal Events PRA finding closure assessment. None of these team members had involvement with the PINGP Fire PRA development.

2. Appendix X: Every member of the independent assessment group should meet the relevant peer reviewer qualifications as stated in the ASME/ANS PRA Standard for the technical elements associated with the F&Os being reviewed.

Response:

Each reviewer of the two F&O closure teams had a minimum of 15 years experience in PRA or Fire Protection analysis. All of the PRA members had prior peer review experience and most had prior finding closure assessment experience. The lead reviewer for both reviews had experience serving as both a lead reviewer for full-scope peer reviews as well as multiple F&O closure assessments. Review team members were selected on the basis of the specific technical skills needed for the F&Os that were identified by NSPM for assessment. Specialty reviewers were used as needed (e.g., fire modeling, cable selection, etc.) to assess specific F&Os.

3. Appendix X: The overall review team experience includes two qualified reviewers for each F&O. An exception to this is allowed for the closure of an F&O related to a single supporting requirement (SR), in which case, a single independent reviewer is acceptable, in alignment with the peer review guidance in the main body of this document and in accordance with the ASME/ANS PRA Standard.

Response:

All of the F&Os that were assessed as part of the Internal Events PRA and Fire PRA were evaluated by a minimum of two reviewers with requisite experience in the technical area being reviewed. In addition, other members of the review team participated in each consensus session. This allowed for additional technical inputs to be provided as needed during the development of the consensus evaluation and closure for each F&O.

4. Appendix X: Each member of the independent assessment team should be knowledgeable about the F&O independent assessment process used to assess the adequacy of the F&O resolution.

Response:

All of the PRA members of finding closure assessment teams had supported previous peer reviews, and most had supported other Appendix X finding closure assessments. Fire protection assessment team members had previously supported Fire PRA peer reviews or NFPA-805 transitions.

5. Appendix X: The total number of reviewers is a function of the scope and number of finding F&Os to be reviewed for closure.

Response:

The PINGP Internal Events finding closure assessment reviewed 31 findings with a team of four reviewers. The Fire PRA finding closure assessment reviewed 41 findings with a team of 11 reviewers. As noted above, specialty reviewers (Fire Protection reviewers) assessed only a limited number for F&Os that pertained to items such as cable selection and fire modeling issues.

- d) *Explain how closure of the F&Os was assessed to ensure that the capabilities of the PRA elements, or portions of the PRA within the elements, associated with the closed F&Os now meet capability category II (CC-II) for supporting requirements (SRs) from ASME/ANS RA-Sa-2009, as endorsed, with clarifications and qualifications, by RG 1.200, Revision 2.*

NSPM Response:

The review team examined the changes made to the PINGP PRA models, data, and documentation that addressed the findings to determine if the issues identified in the peer reviews were adequately addressed such that the CC-II requirements of the ASME/ANS PRA Standard, including clarifications imposed by NRC Regulatory Guide (RG) 1.200, were met. The review team found instances in which the F&O resolutions did not fully meet the CC-II requirements, resulting in those F&Os remaining open. The F&Os remaining open after the finding closure review were provided in Reference 1.

- e) *Discuss whether the F&O closure review scope included all finding-level F&Os, including those finding-level F&Os that are associated with "Met" SRs. If not, identify and provide detailed descriptions for any F&Os that were excluded from the F&O closure review scope, and their associated disposition for the application.*

NSPM Response:

The finding closure assessment for Internal Events and Fire PRA models evaluated all finding-level F&Os, including those in which the underlying SRs were assessed as "Met".

- f) *For any SRs that were found to be only met at CC I by previous peer review team(s), summarize the disposition of these SRs and how it was concluded they now meet CC II. Include discussion of whether all associated F&Os described what was needed to achieve CC II and how the F&O reviewed and closed by the F&O closure team.*

NSPM Response:

For the Internal Events PRA finding closure review, two of the 31 F&Os pertained to SRs that were initially assessed at CC-I. Both F&Os were determined to now meet CC-II. These F&Os were:

- F&O 01-22: SR LE-C3 was assessed as CC-I because the PRA did not consider possible repair actions in the large early release frequency (LERF) evaluation. An assessment and detailed discussion on the potential for equipment repair for the top 95% of LERF sequences was added to the Quantification notebook, which is pointed to from the LERF notebook.
- F&O 02-10: SR HR-D2 was assessed as CC-I because not all risk-significant pre-initiator Human Error Probabilities (HEPs) were quantified using detailed assessments. The resolution was that detailed assessments were added for all risk-significant pre-initiator HEPs.

Five of the 41 F&Os for the Fire PRA F&O closure review included SRs that were initially assessed at CC-I. Two of these F&Os were assessed to still only meet CC-I and, therefore, remain open. The other three were determined to now meet CC-II. These three were:

- F&O CS-B1-01: SR CS-B1 was assessed as CC-I since overcurrent coordination and breaker protection analyses were not complete at the time of the peer review. These evaluations are now completed.
- F&O FSS-D9-01: SR FSS-D9 was assessed as CC-I since evaluation of potential smoke damage to electronics had not been performed. The PRA now evaluates smoke damage and includes failure due to such damage where applicable.
- F&O FSS-F3-01: SR FSS-F3 was assessed as CC-I since a completed quantitative assessment of fire scenarios (including structural steel failures) was not available at the time of the peer review. The quantitative assessments have now been completed in accordance with CC-II requirements.

As with all of the F&Os reviewed by the closure assessment team, each F&O resolution was reviewed against the concerns raised in the F&O as well as the specific SRs that were referenced in the F&O to ensure that the resolution addressed the documented issues and met the CC-II requirements of each SR.

NRC Question 2:

Section 2.3.3 of the LAR states “PINGP fire PRA will be utilized in a supplementary role (as discussed further in Section 3.0) since the fire PRA model is based on the PINGP plant configuration assuming completion of all NFPA-805 design improvements.” Table S-2 of NFPA 805 LAR Attachment S “Modifications and Implementation Items” outlines those design improvements that are scheduled for completion by second refueling outage per issuance of NFPA 805 license amendment (August 8, 2017). Responses to the following will provide additional clarification with regard to use of the Fire PRA:

- a) Provide those plant modifications listed in Table S-2 that are currently scheduled for completion beyond the second refueling outage.*

NSPM Response:

As required, the plant modifications listed in Table S-2 are currently scheduled for completion within the timeframe specified by the license condition.

- b) NEI 04-10 Step 10 “Initial Assessment for Fire Events” states that “if the plant has a Fire PRA, then the next step of the screening process is to determine whether the SSC is evaluated in the fire PRA....”*
 - i. Provide detailed justification that explains the basis for why PINGP opts to not follow the guidance outlined in NEI 04-10 Step 10 with regard to determining the use of Fire PRA on case by case basis.*

NSPM Response:

NEI 04-10, Revision 1 (Reference 3), provides guidance for the assessment of fire risk impacts using several different approaches. This includes the use of a qualitative or bounding risk analysis per Step 10 of the guidance. The NEI document allows for the use of a qualitative screening analysis as an initial evaluation method.

For implementation of NEI 04-10, Revision 1, with respect to the PINGP fire risk, if the qualitative information is deemed sufficient to support the acceptability of the Surveillance Test Interval (STI) change, it will be used to provide the basis for the qualitative conclusions to the Integrated Decisionmaking Panel (IDP). Since only qualitative considerations are provided in this case, the impacts of the STI change on fire events will not be incorporated into the cumulative impact evaluation as noted in NEI 04-10, Revision 1, Step 10a. However, in accordance with NEI 04-10, Revision 1, Step 10a, if this qualitative information is not deemed sufficient for assessing the fire risk contribution, then a bounding analysis (Step 10b) would be performed using the PINGP fire Individual Plant Examination of External Events (IPEEE) evaluation to estimate the impact of the STI change on fire risk.

As noted in the Reference 1 LAR, the PINGP Fire PRA is compliant with RG 1.200, Revision 2. However, the credited NFPA-805 modifications have not yet been implemented at the site. Therefore, the Fire PRA does not represent the current as-built, as-operated plant and cannot be used as the basis for fire risk impact at this time. NSPM proposed that in addition to the above discussed process, the Fire PRA model for PINGP be used to perform quantitative risk assessment sensitivity cases on the STI changes that can be adequately characterized by the Fire PRA model. NSPM intends to evaluate each STI change that can be evaluated within the scope of the Fire PRA model to confirm the conservatism of the bounding fire IPEEE evaluation. This approach was selected as it ensures the current fire risk estimate is bounding, and that once all NFPA-805 design modifications are installed and implemented, the risk evaluation of each implemented STI change remains valid with respect to the original STI evaluations performed using the IPEEE insights.

As discussed in the LAR submittal, the PINGP Fire PRA has been peer reviewed and has had an Appendix X closure review. The remaining open F&O findings were submitted with the application. Once the Fire PRA credited NFPA-805 plant modifications are installed, the Fire PRA model will be used to perform the quantitative risk assessment in accordance with the NEI 04-10 process. The fire IPEEE would no longer be used for evaluating fire risk impacts for future STI changes.

- ii. *In the case that minimal number or low risk significant design improvements remain after the second refueling outage, provide an updated process for how the fire PRA will be used for TSTF-425 surveillance changes.*

NSPM Response:

As noted in response to 2.a, all plant modifications listed in Table S-2 are currently scheduled for completion within the license condition timeframe. However, the fire risk evaluation approach described in response to RAI 2.b.i would also apply to this situation.

NRC Question 3:

Provide the following information with regard to remaining open F&Os described in the Table 2-1:

- a) *Finding CS-A10-01 states that cables routed through 16 fire compartments have not been identified nor has the methodology been specified. The resolution indicates that this supporting requirement is met at CC-1 using a conservative approach. Describe the conservative approach used in lieu of developing cable routing information for 16 fire compartments.*

NSPM Response:

Sixteen fire compartments are subsets of larger fire areas. In this case, cable routing was by fire area, which failed more cables than necessary in some fire scenarios.

Subsequent to the F&O closure review, a new Fire PRA model (Revision 5.3) was approved in April 2018. To specifically resolve the F&O, this revision of the Fire PRA model incorporated the results of additional plant walkdowns and drawing reviews performed in order to refine cable routing reflected in the PINGP Fire PRA model. The cable to fire compartment table was updated as well as the documentation of the issue. The cables in these 16 fire compartments are now mapped to fire compartment; not fire area. Therefore, the conservative approach is no longer being relied upon.

- b) *Finding FSS-D7-01 indicates that the F&O closure review team determined to keep this finding open since the unreliability of the detection system for the deluge system is not incorporated in the PRA. In a letter dated May 24, 2016 (ADAMS Accession No. ML16152A046) to the NRC, Xcel Energy notes in Table 1, PRA RAI 01.g the following: "The non-suppression probability has been calculated as sum of the unreliability and the unavailability values corresponding to each credited automatic detection and suppression system. This approach has been implemented in all the scenarios analyzed with detailed fire modeling crediting automatic suppression in the Fire PRA." This statement is inconsistent with the finding observed by the closure review team. Provide the following information regarding characterization of suppression systems:*
- i. *Provide results of extent of condition analysis to determine additional detection systems that did not factor unreliability into the PRA calculation. If other detection systems, beside deluge system, are discovered to not factor unreliability, provide sensitivity analysis that shows risk impact for each system.*

NSPM Response:

Pre-action fire suppression systems PA-14 and PA-15 are the only water-based fire suppression systems with deluge valves actuated by the fire detection system that are credited in the Fire PRA model. The Fire PRA finding closure team did not close finding FSS-D7-01 in October 2017 because the unreliability of the detection system for the deluge system had not been incorporated into the Fire PRA quantification.

Subsequent to the October 2017 F&O closure review, a new Fire PRA model was approved (April 2018) that incorporated the updated unreliability for the pre-action suppression systems (PA-14 and PA-15). The process used to calculate the fire ignition frequencies for structural steel fire scenarios was re-performed. The non-suppression probability for the deluge systems was revised to correct the identified errors. All frequencies reported in the structural steel documentation now match the Fire PRA model.

Prior to March 2017, the Carbon Dioxide (CARDOX) Fire Suppression System was actuated by dedicated thermal detectors that were not part of the Fire Detection System. Therefore, unavailability of the fire detection system did not impact the CARDOX suppression system's ability to automatically actuate. CARDOX was modified to be actuated by the fire detection system in March 2017. The site specific calculation for the unavailability of the CARDOX system has been updated to reflect the most recent six years of unavailability data for the CARDOX suppression system and for the detection system that actuates CARDOX. Generic unreliability for fire detection and suppression system were used. After updating the CARDOX unavailability calculation, the new values are similar to and bounded by the previous values used in the Fire PRA quantification. Therefore, no additional sensitivity study is required for CARDOX.

No other fire suppression systems credited in the Fire PRA model omitted the unreliability of the fire detection system required to actuate the suppression system. Therefore, no sensitivity analysis is required.

- ii. *With regard to deluge system, describe how the risk impacts of omitting unreliability in the calculation would be conservatively assessed for STI change evaluations; and provide a complete list of STI cases for which this assessment would have to be performed.*

NSPM Response:

The Fire PRA model was updated in April 2018 to correct the unreliability and unavailability for PA-14 and PA-15 to match the quantification. Based on the use of appropriate unavailability and unreliability values, no special assessments for deluge valves are required for STI change evaluations.

- iii. *Provide an approximate timeline for closure of this F&O.*

NSPM Response:

The unreliability and unavailability values for pre-action systems PA-14 and PA-15 were updated in the Fire PRA model revision approved in April 2018. The unreliability and unavailability of the CARDOX system is planned to be incorporated into the next Fire PRA model update in accordance with the appropriate NSPM procedure for model maintenance and update.

- c) *Finding SY-A17-01 indicates that the closure review team determined that the F&O related to Flowserve N-9000 reactor coolant pump (RCP) seals should remain open. Provide clarification that describes the current basis for modeling N-9000 RCP seals and technical justification for any PRA credit if abeyance seal modifications are employed or provide sensitivity that removes PRA credit.*

NSPM Response:

A sensitivity study has been performed to remove credit for the abeyance seal in the current PRA model of record that shows no more than 6% increase to Internal Events Core Damage Frequency (CDF)/LERF (Unit 1 and Unit 2) and no more than 3% increase to Fire CDF/LERF (Unit 1 and Unit 2).

Internal Events Results with Abeyance Failed				
Top Event	Rev 5.3 (Baseline)	Rev 5.3 (Abeyance Failed)	Delta	Percent Change
U1 CDF	1.28E-05	1.33E-05	5.00E-07	4%
U1 LERF	2.15E-07	2.19E-07	4.00E-09	2%
U2 CDF	1.25E-05	1.32E-05	7.00E-07	6%
U2 LERF	1.86E-07	1.92E-07	6.00E-09	3%

Fire PRA Results with Abeyance Failed				
Top Event	Rev 5.3-APP1 (Baseline)	Rev 5.3-APP1 (Abeyance Failed)	Delta	Percent Change
U1 CDF	6.60E-05	6.68E-05	8.00E-07	1%
U1 LERF	9.60E-07	9.67E-07	7.00E-09	1%
U2 CDF	6.59E-05	6.76E-05	1.70E-06	3%
U2 LERF	9.26E-07	9.40E-07	1.40E-08	2%

3.0 REFERENCES

1. Letter from NSPM to NRC Document Control Desk, "License Amendment Request: Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program", dated March 15, 2018 (ADAMS Accession No. ML18074A308)
2. Email from NRC to NSPM, "Request for Additional Information RE: Prairie Island TSTF-425 License Amendment Request", dated August 23, 2018 (ADAMS Accession No. ML18235A298)
3. Nuclear Energy Institute (NEI) 04-10, "Risk-Informed Technical Specifications Initiative 5b, Risk-Informed Method for Control of Surveillance Frequencies", Revision 1, dated April 2007 (ADAMS Accession No. ML071360456)