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L-MT-18-041
10 CFR 50.12
10 CFR 50 Appendix R

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 regarding Request for Permanent Exemption from 10 CFR 50 Appendix R III.G.2.a Requirements for Exposed Structural Steel (EPID L-2018-LLE-0001)

References:
1) NSPM letter to NRC, "Request for Permanent Exemption from 10 CFR 50 Appendix R III.G.2.a Requirements for Exposed Structural Steel", dated March 21, 2018 (ADAMS Accession No. ML18080A161)

2) NRC email to NSPM, "Request for Additional Information RE: Monticello Request for Exemption from Appendix R Requirements (L-2018-LLE-0001)", dated June 22, 2018 (ADAMS Accession No. ML18173A051)

In accordance with 10 CFR 50.12, Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, requested in Reference 1, an exemption from the requirements of 10 CFR 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," for the Monticello Nuclear Generating Plant. Specifically, NSPM requested a permanent exemption from the requirements of 10 CFR 50, Appendix R, Subsection III.G.2.a with respect to the requirement that structural steel supporting a fire barrier or forming a fire barrier be protected to provide fire resistance equivalent to that of the fire barrier. By email dated June 15, 2018, the NRC provided a draft Request for Additional Information (RAI) regarding NSPM's application in Reference 1. On June 21, 2018, members of the NRC staff conducted a conference call with NSPM in order to provide clarification on the draft RAIs. Subsequently, the NRC provided the final RAIs in Reference 2. The enclosure to this letter provides NSPM's response to the NRC RAIs.

If additional information is required, please contact Mr. Leonard Sueper at (612) 330-6917.

Summary of Commitments

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

Christopher R. Church
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

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Request for Permanent Exemption from 10 CFR 50, Appendix R, III.G.2.a Requirements for Exposed Structural Steel

On March 21, 2018, Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, submitted a request for a permanent exemption for the Monticello Nuclear Generating Plant (MNGP). Specifically, NSPM requested a permanent exemption from the requirements of 10 CFR 50, Appendix R, Subsection III.G.2.a with respect to the requirement that structural steel supporting a fire barrier or forming a fire barrier be protected to provide fire resistance equivalent to that of the fire barrier. A portion of the structural steel supporting the floor of the Cable Spreading Room is not provided with fireproofing material to provide a fire resistance equivalent to that of the barrier. By email dated June 22, 2018, the NRC requested the following additional information. NSPM's response to this request for additional information (RAI) is provided below.

RAI 01

Section 3.2 of the submittal states that the ignition sources in the area consist of batteries, battery chargers, a dry transformer, or electrical cabinets. In Section 3.3.2, the licensee states that a 317 kW transient fire was assumed to represent the most limiting postulated fire and that NUREG/CR-6850 was used as guidance for the analysis. However, it is not clear why a smaller transient fire was selected when the primary ignition sources noted all represent larger postulated fires.

Provide the technical justification for why the smaller transient fire was selected as more limiting than a battery, battery charger, dry transformer, or electrical cabinet fire.

NSPM Response

All potential ignition sources in Fire Zones 7A, 7B, and the portion of Fire Zone 10 below the Cable Spreading Room were reviewed prior to performing fire modeling. Fixed ignition sources in the areas are listed below in Table 1 along with their heat release rates and durations as specified in NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities", Volume 2, and NUREG-2178, "Refining and Characterizing Heat Release Rates from Electrical Enclosures During Fire (RACHELLE-FIRE)", Volume 1. As shown in Table 1, the 317 kW transient fire was selected as it corresponds to the most limiting combination of heat release rate and fire duration. The heat release rates and shorter durations demonstrated by the other potential ignition sources are subsumed by the transient 317 kW fire that continues for 60 minutes.

The electrical cabinet was assumed to be low fuel loaded based on the nature of its contents. NSPM modeled the transient fire with a constant heat release rate of 317 kW throughout the 60 minute duration of the fire. As detailed in NUREG/CR-6850, the cabinet fire has a growth and decay period and supplies its maximum heat release rate for only a portion of the

39 minute fire. NSPM assumed the difference in fire growth profiles would result in the transient fire being found to be more limiting than the cabinet fire despite its smaller peak heat release rate. NSPM subsequently performed a sensitivity analysis with a cabinet fire using the default load heat release rate of 400 kW. The results of the sensitivity demonstrated lower resultant structural steel temperatures for the cabinet fire than the transient fire and, therefore, the continued acceptability of the exposed structural steel.

Table 1 – Fire Data for Potential Ignition Sources in Fire Zones 7A, 7B, and 10

Ignition Source	**Heat Release Rate*** (kW)	**Duration** (minutes)
Battery	69	39
Battery Charger	130	39
Electrical Enclosure: Small	45	39
Electrical Enclosure: Large and Closed (Low Fuel)	200	39
Electrical Enclosure: Large and Closed (Default)	400	39
Transient Combustibles	317	60
Transformer (Dry)	69	39

*All heat release rates listed are the 98th percentile values.

RAI 02

Section 3.3.2 of the submittal states that the physical fire dimensions of the assumed 317 kilowatt (kW) fire were 2 foot (ft) by 2 ft for the plant access control area and 1 ft by 1 ft for the battery rooms. Since the physical dimensions of the prescribed fire can impact the resulting zone of influence, it is not clear why a 317 kW fire in different locations had different zones of influence.

Provide the technical justification for why different fire dimensions were used for otherwise identical heat release rates.

NSPM Response

The analysis for the plant access control area was initially focused on the effects of a transient fire on the structural steel columns in the area. Because the fire was assumed to be immediately adjacent to a column, it was determined that the steel columns would represent the limiting case and the structural steel beams were not considered in the sensitivity analyses that were run to determine the limiting fire size. A 2 ft by 2 ft fire was determined to result in the greatest temperatures in the structural steel columns. Subsequently, a further sensitivity analysis was run to determine the limiting fire size for the structural steel beams. It was determined that a 1 ft by 1 ft fire directly under the steel beam was more limiting with respect to the structural steel beam temperature which is consistent with the battery room analysis. When the fire size was adjusted to maximize the steel beam temperature, the resultant temperature was approximately 600°F, well below the acceptance criterion of 1100°F.The 2 ft by 2 ft fire was more limiting for the structural steel column because it provided a larger area to radiatively

transfer heat to the steel. Alternatively, the 1 ft by 1 ft fire was more limiting for the structural steel beams in both areas because it allowed less air entrainment than the larger 2 ft by 2 ft fire.

RAI 03

Section 3.3.2 of the submittal states that for the battery rooms analysis, the door to the room was assumed to be open but does not state whether the same assumption was made for the plant access control area. Since the door position, i.e., oxygen supply, in the model can impact the combustion properties and results, it was not clear what assumptions were applicable for the plant access control area.

State whether the same assumptions used for the battery rooms were made for the plant access control area, or provide the technical justification for not doing so.

NSPM Response

Analyses for the areas were performed to obtain conservative results by avoiding oxygen-limited configurations. This conservative assumption was explicitly described in the application for the battery rooms analysis due to the fact that there are physical doors on the room egresses. Contrary to the battery room configuration, the plant access control area is directly connected to the first floor and remainder of the Plant Administration Building basement by an open stairway and open doorways, none of which have attached doors. These openings were modeled as providing an unlimited supply of oxygen to a fire in the Fire Dynamics Simulator runs. For the plant access control area, conservative results are obtained when the doors to the battery rooms are closed. This configuration limits the amount of air space for the heat to dissipate into and, therefore, results in slightly higher temperatures in the plant access control area.