2807 West County Road 75
Monticello, MN 55362

800.895.4999
xcelenergy.com

March 21, 2018

L-MT-18-001
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

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

In accordance with 10 CFR 50.12, Northern States Power Company, a Minnesota Corporation, doing business as Xcel Energy (hereafter "NSPM"), hereby requests 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 (MNGP). Specifically, NSPM requests 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 Cable Spreading Room is not provided with fireproofing material to provide a fire resistance equivalent to that of the barrier. On February 8, 2018, NSPM and the NRC held a public meeting to discuss this proposed exemption for MNGP.

The enclosure provides the technical information supporting the exemption request. The requested exemption meets the requirements in 10 CFR 50.12 in that it is authorized by law, will not present an undue risk to the health and safety of the public, is consistent with the common defense and security, and special circumstances are present. In this case, compliance with the rule is not necessary to achieve the underlying purpose of the rule.

NSPM requests the NRC grant this exemption by April 21, 2019.

If there are any questions or if additional information is required, please contact Mr. Shane Jurek at (612) 330-5788.

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

ENCLOSURE

MONTICELLO NUCLEAR GENERATING PLANT

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

1. SUMMARY DESCRIPTION

In accordance with 10 CFR 50.12, Northern States Power Company, a Minnesota Corporation, doing business as Xcel Energy (hereafter "NSPM"), hereby requests 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 (MNGP). Specifically, NSPM requests 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. The requested exemption meets the requirements of 10 CFR 50.12 in that it is authorized by law, will not present an undue risk to the health and safety of the public, is consistent with the common defense and security, and special circumstances are present. In this particular circumstance, application of the subject regulation is not necessary to achieve the underlying purpose of the rule.

2. BACKGROUND

During preparations for the 2017 triennial fire protection inspection at MNGP, it was identified that structural steel columns and beams supporting the floor of the Cable Spreading Room were not coated with fireproofing material to provide fire resistance equivalent to that of the fire barrier. A fire area approach is employed at MNGP to demonstrate compliance with 10 CFR 50, Appendix R. Fire zones are combined into fire areas based on the redundant trains of safe shutdown equipment therein and the feasibility of providing adequate fire boundary barriers to separate them from other fire areas. The Cable Spreading Room at MNGP (Fire Zone 8) is a part of Fire Area VI with the remainder of the fire area being comprised of Fire Zones 7A, 7B, 10, and 11. The alternate shutdown system is the credited safe shutdown strategy for Fire Zone 8; Division II equipment is the credited safe shutdown strategy for Fire Zones 7A, 7B, 10, and 11. Because the shutdown strategy is different for the Cable Spreading Room than the rest of Fire Area VI, it is not appropriate for the Cable Spreading Room to be a part of Fire Area VI. Therefore, the barriers between the Cable Spreading Room and adjacent fire zones must meet the requirements of 10 CFR 50, Appendix R. The failure to properly protect the structural steel represents a noncompliance with 10 CFR 50, Appendix R, III.G.2 (hereafter "III.G.2"), which states:

> Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation

or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that of the barrier. . .

Subsequent to identification of the issue, NSPM took actions to bolster the fire protection strategy at MNGP. Specifically, structural steel columns supporting the Cable Spreading Room floor were treated with fireproofing material to provide the equivalent of a three hour rated barrier. Additionally, NSPM reduced combustibles in the fire zones to reduce overall fire loading.

3. TECHNICAL EVALUATION

3.1. Fire Protection Program

The MNGP Fire Protection Program, consistent with Branch Technical Position (BTP) APCSB 9.5-1, 10 CFR 50.48, 10 CFR 50 Appendix R, and supporting generic communications, is designed and implemented based on a foundation of defense-in-depth protection. The defense-in-depth consists of:

- Fire Prevention – Preventing fires from starting through control of fuel and ignition sources and conditions.

- Fire Detection and Suppression – Providing the capability to promptly detect any fires that may occur and the capability to promptly and effectively control and extinguish any such fire.

- Protection of Safe Shutdown Capability – Providing protection for systems, structures, and components important to safety such that any fire that is not promptly detected and extinguished will not prevent the safe shutdown of the plant.

Fire Prevention: The fire prevention defense-in-depth is composed of administrative controls as well as inherent plant design features. Noncombustible materials have been used to the extent practicable in original plant design and in any subsequent plant modifications. This includes structural components as well as the use of flame-resistant electrical cable insulation. Introduction of combustible materials into the power block is strictly controlled by NSPM procedures , which require fire protection team review and approval prior to the introduction of any transient combustibles exceeding established limits for that zone. Routine transient combustible inspections ensure validation and enforcement of the controls on transient combustibles. Hot work in the plant is also procedurally controlled , for processes including

open-flame work, cutting, welding, and grinding. Based on the above, the potential for exposure fires (in transient combustibles) and fires resulting from the introduction of ignition sources (hot work) is limited or compensatory measures are instituted.

Fire Detection and Suppression: The fire detection and suppression is installed in plant areas based primarily on the significance of the fire hazards contained within that area. Fire detection includes smoke, heat, and flame detection systems that typically provide alarms to the Control Room. Suppression systems include pre-action, deluge, dry and wet pipe sprinkler systems, and halon total-flooding suppression systems. Hydrants, hose stations, and fire extinguishers are located throughout the plant to facilitate firefighting activities. The installed fire detection and automatic suppression systems, in conjunction with the fire brigade response and deployment of the available manual fire suppression features, provide reasonable assurance that a fire will be precluded from rapidly growing and involving other fire zones or areas.

Protection of Safe-Shutdown Capability: The protection of safe-shutdown capability defense-in-depth is represented by adequate fire area boundary barriers. These barriers provide reasonable assurance that a fire that is not promptly detected and not promptly controlled and suppressed will ultimately be contained within the fire area of origination. Each fire area is separated from adjacent fire areas with a barrier commensurate with the hazards of the area. The fire barriers typically have a three-hour fire resistance rating, including the barrier, doors, fire dampers, and penetration seals. Fire area boundaries are described in the MNGP Fire Hazards Analysis (Reference 1). The MNGP Appendix R Safe-Shutdown Analysis (Reference 2) documents the basis for achieving safe shutdown following a fire in any given fire area. The equipment lost and the equipment available has been reviewed and the actions necessary to ensure shutdown have been identified in the post-fire safe-shutdown procedures.

3.2. Summary of Applicable Fire Zones

The Cable Spreading Room is located on the 939 ft Elevation of the Plant Administration Building (PAB). It is bordered by the Turbine Building to the north, other PAB areas to the east and south, and the Reactor Building to the west. The Cable Spreading Room is directly above the 125V Division I and II Battery Rooms, 250V Division I Battery Room, and other portions of the basement of the PAB. The Cable Spreading Room is directly below the Control Room.

Because the Cable Spreading Room north and west walls, the entirety of the ceiling, and the portion of the floor over the125V Division II Battery Room were previously classified as fire barriers between adjacent fire areas, they have already been demonstrated to meet the requirements of 10 CFR 50, Appendix R. Additionally, the east and south walls separating the Cable Spreading Room from other rooms on the 939 ft Elevation of the PAB are comprised of poured concrete and provide a three hour fire barrier.[1] Therefore, the only boundary of the Cable Spreading Room which will not meet 10 CFR 50, Appendix R is the portion of floor that is not directly above the Division II Battery Room. Thus, the scope of this exemption request is limited to the unprotected structural steel in the floor of Fire Zone 8 (Cable Spreading Room)

[1] Three dampers in the south wall of the Cable Spreading Room do not currently have a three-hour fire rating. These dampers are not within the scope of this exemption request.

forming the barrier with all or parts of Fire Zones 7A, 7B, and 10 (125V Division I Battery Room, 250V Division I Battery Room, and PAB, respectively).

The details of combustible loading/fire severity and active fire protection features for the specific fire zones of concern are listed in Table 1. As described below and in MNGP's Fire Hazards Analysis, the localization of the hazards and combustibles by fire zone, combined with the separation between fire zones by spatial and barrier separation, provide reasonable assurance that fires that occur within a given zone will be confined to the fire zone of origination. Table 1 summarizes the fire protection program features in each of the applicable fire zones.

Table 1 – Summary of Fire Zones

Fire Zone	Plant Area	Fire Detection		Fixed Fire Suppression		Manual Fire Suppression	Adjacent Suppression	
		Type	Coverage	Type	Coverage		Equipment	Fire Zone
7A	125V Division I Battery Room	Ionization	Full	None	N/A	None	Hose Station Portable Extinguisher	10
7B	250V Division I Battery Room	Ionization	Full	None	N/A	None	Hose Station Portable Extinguisher	10
8	Cable Spreading Room	Ionization Thermal	Full	Halon	Full	Portable Halon Extinguisher	Hose Station	10
10	PAB (Multiple Rooms)	Ionization	Partial	Halon	Partial	Hose Station Portable Extinguisher	None	N/A

Summary descriptions of each of the fire zones are provided below. The types of combustibles, available detection and suppression, and smoke/hot gas ejection methods are identified.

- Fire Zone 7A – 928 ft Elevation, PAB (125V Division I Battery Room)
    - The combustible loading in this zone primarily consists of battery cases and cable insulation. Combustible loading is administratively controlled by NSPM procedures. Ignition sources within the fire zone include batteries, battery chargers, and electrical cabinets. There is no fixed fire suppression system installed in this zone, but hose stations and portable extinguishers are available in an adjacent fire zone. The ionization detection system alarms in the control room thereby providing an early warning of a fire and, subsequently, an early response of the fire brigade to extinguish the fire. Smoke and hot gases can be evacuated using normal air handling systems or opening the access door. Portable smoke ejectors can be used as a backup. The zone contains Division I safe shutdown equipment. In the event of a fire in this zone, Division II safe shutdown equipment would be available for shutdown.

- Fire Zone 7B – 928 ft Elevation, PAB (250V Division I Battery Room)

    - The combustible loading in this zone primarily consists of battery cases and cable insulation. Combustible loading is administratively controlled by NSPM procedures. Ignition sources within the zone include batteries, battery chargers, and electrical cabinets. There is no fixed fire suppression system installed in this zone, but hose stations and portable extinguishers are available in an adjacent fire zone. The ionization detection system alarms in the control room thereby providing an early warning of a fire and, subsequently, an early response of the fire brigade to extinguish the fire. Smoke and hot gases can be evacuated using normal air handling systems or opening the access door. Portable smoke ejectors can be used as a backup. The zone contains Division I safe shutdown equipment. In the event of a fire in this zone, Division II safe shutdown equipment would be available for shutdown.

- Fire Zone 8 – 939 ft Elevation, PAB (Cable Spreading Room)

    - The combustible loading in this zone primarily consists of cable insulation. Combustible loading is administratively controlled by NSPM procedures. Ignition sources within the zone include electrical cabinets. The fire zone is equipped with an automatic halon suppression system as well as portable extinguishers. Hose stations are located in adjacent fire zones. The ionization and thermal detection systems alarm in the control room thereby providing an early warning of a fire and, subsequently, an early response of the fire brigade to extinguish the fire. Smoke and hot gases can be evacuated using normal air handling systems with portable smoke ejectors available as a backup, if necessary. The zone contains both Division I and Division II safe shutdown equipment. In the event of a fire in this zone, the alternate shutdown system would be available for safe shutdown.

- Fire Zone 10 – Multiple Elevations, PAB (Plant Administration Building excluding the Battery, Cable Spreading, Control, and HVAC Rooms). The scope of this exemption request is limited to a portion of this fire zone on the 928 ft Elevation. However, the discussion below includes features of the fire zone in its entirety.

    - The combustible loading in this zone primarily consists of those combustibles typical of office occupancy. As Fire Zone 10 is comprised mostly of office space, the introduction of combustible material is not controlled in the same manner as fire zones in the power block. Ignition sources include an electric motor, a power transformer, ventilation systems, and electrical cabinets. However, electrical cabinets and one dry power transformer are the only ignition sources present in the portion of the fire zone below the Cable Spreading Room. Portions of the fire zone (Records Storage Vault and Computer Room) are equipped with automatic halon suppression systems. There is no fixed fire suppression system installed in the remainder of the fire zone, but hose stations and portable extinguishers are available throughout.

Ionization detectors are available in portions of the fire zone and will alarm in the control room thereby providing an early warning of a fire and, subsequently, an early response of the fire brigade to extinguish the fire. However, none of the ionization detectors are installed in the portions of Fire Zone 10 pertinent to this request. Smoke and hot gases can be evacuated using normal air handling systems with portable smoke ejectors available as a backup, if necessary. The zone contains Division I safe shutdown equipment. In the event of a fire in this zone, Division II safe shutdown equipment would be available for shutdown.

3.3. Acceptability of Exposed Structural Steel

3.3.1 Structural Steel Survivability Analysis – Limerick Methodology

The NRC has previously granted similar exemptions from III.G.2.a for other licensees (References 3 and 4). The basis for granting those exemptions was a structural steel survivability analysis performed in accordance with the "Limerick Methodology" as initially approved in NUREG-0991, Supplement 2 (Reference 5). The Limerick Methodology uses a mathematical model to calculate the time-temperature profile for potential fires in each fire area. If any of the calculations show that the time-temperature profile in an area will exceed 1100°F within three hours, an evaluation is performed to calculate the corresponding temperature response of the supporting structural steel. If the steel temperature does not exceed 1100°F within three hours, the steel need not be protected.

The Limerick Methodology is based on the availability and quantity of two specific types of fixed combustibles found in a nuclear power plant: cable insulation and lubricating oil. Lube oil is not present and there are no significant concentrations of exposed cable insulation in the applicable MNGP fire zones. Therefore, the areas beneath the Cable Spreading Room would screen out of the Limerick Methodology and the structural steel would not need to be protected with no further analysis required. While the results of this analysis appropriately reflect the low significance of the exposed structural steel, NSPM determined it was prudent to perform additional analysis to demonstrate the acceptability of the exposed structural steel.

3.3.2 Risk Insights

NSPM performed fire modeling using the Fire Dynamics Simulator (FDS) code. FDS is a computational fluid dynamics model of fire-driven fluid flow. It numerically solves the governing equations of fluid dynamics with a particular emphasis on fire and smoke transport. FDS is known to provide better predictions for heat flux and surface temperatures than comparable tools (e.g., CFAST and MAGIC). It has been shown to predict heat flux and wall temperature within 20 percent with a bias towards over-prediction. Two distinct analyses were performed using FDS: the first examined the plant access control area, the second examined the battery rooms. The results of these analyses are summarized below.

An acceptance criterion of 1100°F was established to determine the acceptability of the exposed structural steel. Generic Letter (GL) 83-33"NRC Positions on Certain Requirements of Appendix R to 10 CFR 50" (Reference 6) states that this temperature is typically considered

the critical temperature of steel because at this temperature the yield stress in the steel has decreased to about 60 percent of the value at room temperature. NSPM has reviewed the structural design for the as-built configuration of the PAB and determined that the acceptance criterion in GL 83-33 is applicable to the exposed structural steel supporting the MNGP Cable Spreading Room floor.

For the plant access control area, a transient fire was assumed to occur directly below a structural beam and immediately adjacent to a structural steel column. The assumed fire was the 98th percentile transient fire with a heat release rate (HRR) of 317 kW, consistent with the guidance in NUREG/CR-6850, “EPRI/RES Fire PRA Methodology for Nuclear Power Facilities” (Reference 7), Table G-1. This fire was determined to be the most limiting postulated fire based on a walkdown of the applicable plant areas and review of all potential ignition sources. The duration of the fire was assumed to be one hour. Sensitivity studies were performed to verify the adequacy of the results of the final FDS model. These studies were performed to verify the numerical grid size, the use of a simplified small scale model, and the effects on structural steel temperature based on the location of the fire.

Figure 1 displays the manner in which the structural steel columns and beams were modeled in the plant access control area. A 2ft by 2ft fire located immediately adjacent to a structural steel column is displayed as it was found to be the most limiting configuration (i.e., highest resultant temperatures). The temperature response of an exposed structural steel beam located directly above the transient fire in the plant access control area is presented in Figure 2. Figure 2 identifies that the temperature of the structural steel beam is beginning to level off at approximately 350°F after one hour. Therefore, the critical temperature of 1100°F will not be reached and the structural steel will continue to support the Cable Spreading Room floor despite the lack of fireproofing material.

Figure 1 – FDS Mockup for Plant Access Control Area

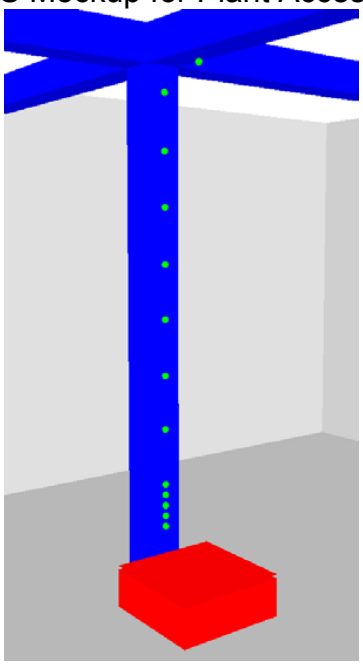
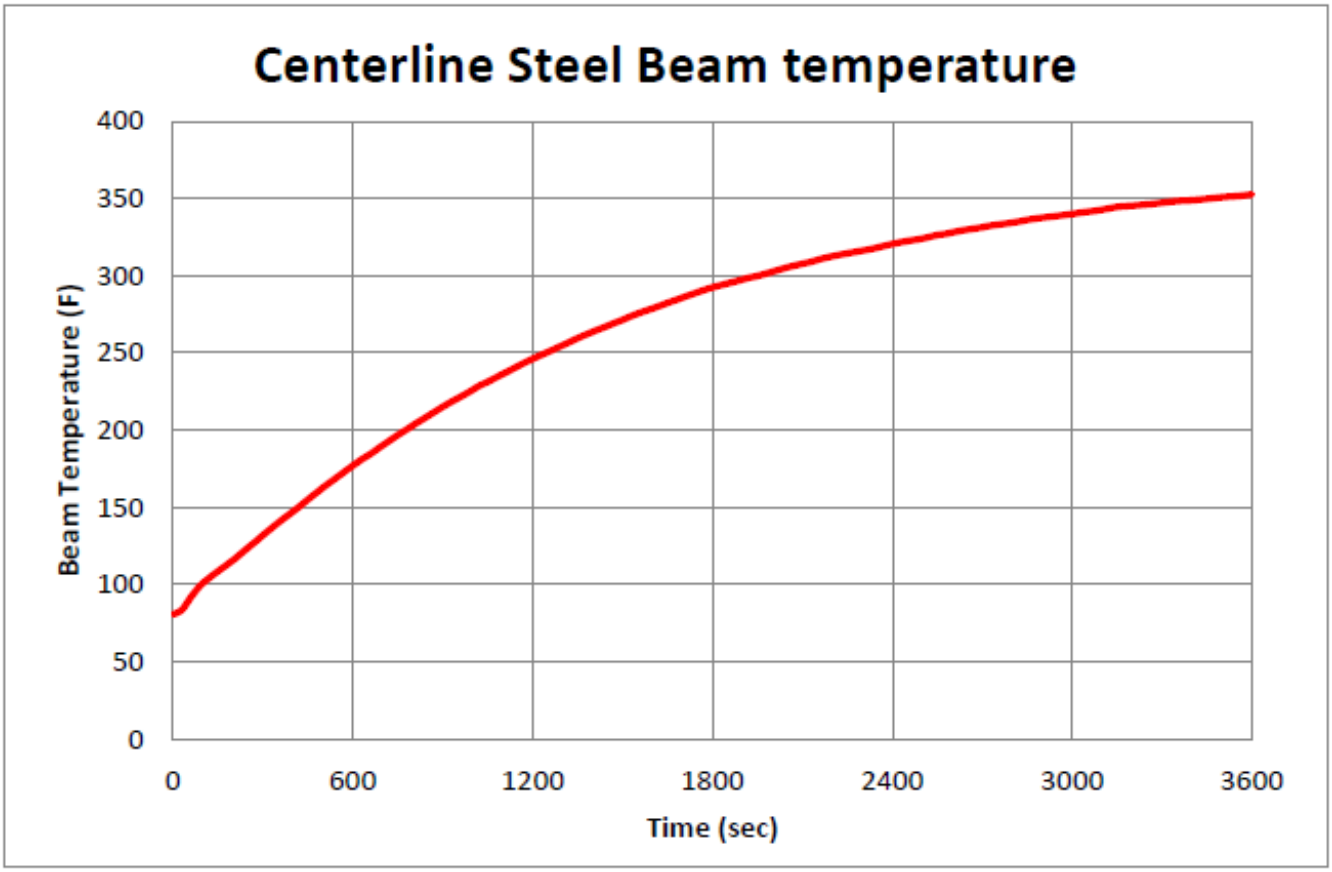


Figure 2 – Temperature Response of Structural Steel Beam in the Plant Access Control Area



For the battery rooms, FDS runs were completed only for the Division I 125 V Battery Room (Fire Zone 7A). Citing the significantly smaller air volume in Fire Zone 7A, NSPM determined the air temperature and resulting structural steel temperature would bound that of a similar analysis for Fire Zone 7B. A 98th percentile transient fire with a HRR of 317 kW was assumed to occur directly below the structural steel, immediately adjacent to a concrete wall. The duration was assumed to be one hour. Sensitivity studies were performed to verify the adequacy of the results of the final FDS model. These studies were performed to verify the numerical grid size, the effects of different fire soot yields, and the effects on structural steel temperature based on the location and size of the fire.

Figure 3 displays the manner in which the structural steel beams were modeled in the Division I 125 V Battery Room. A 1ft by 1ft fire located adjacent to a wall and directly below a structural steel beam is displayed as it was found to be the most limiting configuration (i.e., highest resultant temperatures).The temperature response of the exposed structural steel beam for a variety of modeled conditions (e.g., different fire position, mesh size, soot yields, room door open and closed) is presented in Figure 4. Figure 4 identifies that the temperature of the structural steel beam in the most limiting case levels off at approximately 800°F during the one hour duration of the fire. Therefore, the critical temperature of 1100°F will not be reached and the structural steel will continue to support the Cable Spreading Room floor despite the lack of fireproofing material.

Figure 3 – FDS Mockup for Division I 125 V Battery Room

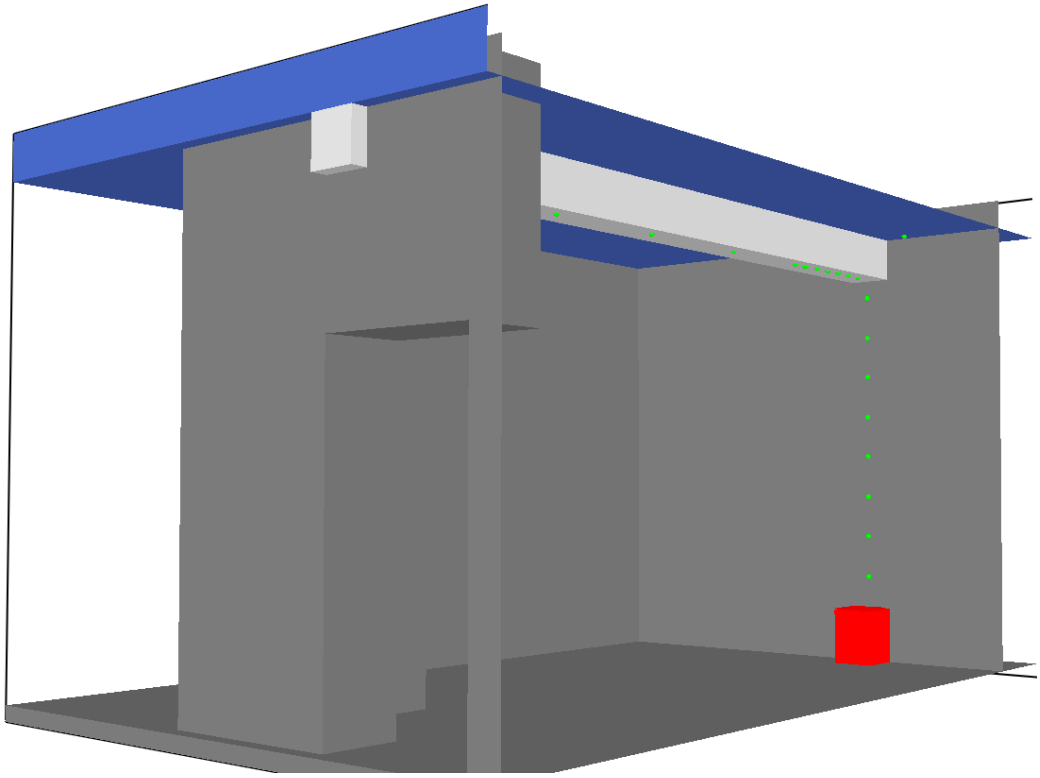
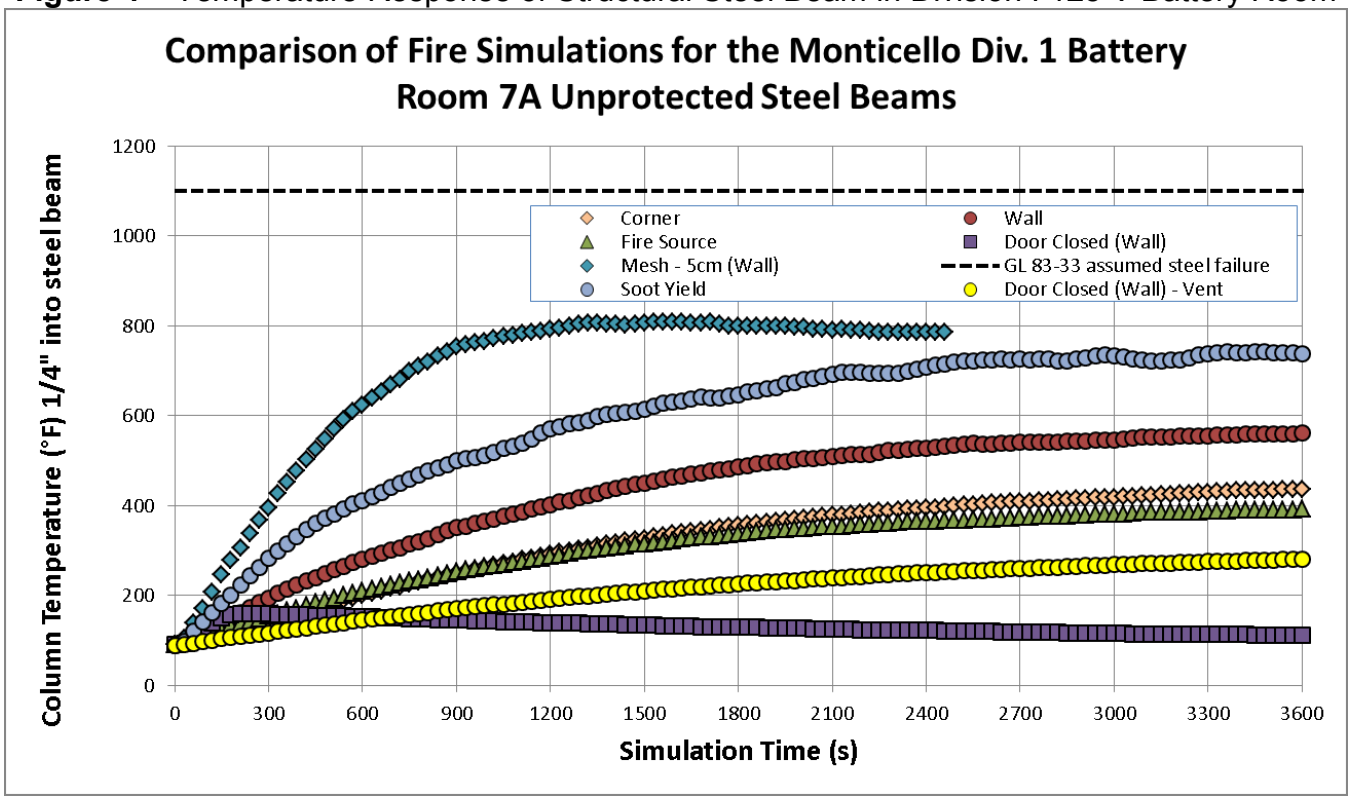


Figure 4 – Temperature Response of Structural Steel Beam in Division I 125 V Battery Room



Conservatisms built into the FDS runs include:

- FDS only simulates one-dimensional heat conduction; therefore, conduction of heat away from the fire plume is not included in the calculations.

- Transient fires were assumed to burn continuously for one hour at the 98th percentile HRR. This is especially conservative when reviewing the HRR over time for the various fires studied in Table G-7 of NUREG/CR-6850 that show transient fires have a growth and decay period on either side of the peak HRR and do not last longer than 15 minutes. These fire studies also show that the higher HRR fires (such as the 98th percentile fire) have durations much shorter than 15 minutes since they quickly burn away the available fuel.

- Ventilation was assumed to be failed for all fire simulations. This conservatively over-predicts the air temperatures in the room since the HVAC would likely run for at least some portion of a real fire.

- No manual or automatic suppression of the fire was assumed to occur for one hour. There is no automatic suppression in the areas, but there is a continuously staffed room (Secondary Alarm Station (SAS)) in the vicinity with open ventilation paths between the SAS and the plant access control area. The personnel in the SAS are likely to identify a fire in any of the areas quickly and alert the fire brigade. Furthermore, the plant access control area is the main entrance and exit for all personnel into and out of the Turbine and Reactor Buildings. If there is a fire in the area, there is a high likelihood of it being discovered and suppressed rapidly.

- For the battery room analysis, the door to the room is assumed to be open for all scenarios to ensure the fire does not become oxygen-limited. This is conservative as these doors are typically kept closed and a postulated fire was determined to burn out within 3 minutes of ignition.

NSPM has determined that, based on fire modeling, the critical temperature of 1100°F for the structural steel will not be reached during a postulated fire. Therefore, the exposed structural steel will not fail despite the lack of fireproofing and need not be protected.

4. JUSTIFICATION FOR EXEMPTION

10 CFR 50.12, “Specific Exemptions”, states that the NRC may grant exemptions from the requirements of the regulations of 10 CFR Part 50 provided the following are met: (1) the exemption is authorized by law; the exemption will not present an undue risk to the health and safety of the public; and the exemption is consistent with the common defense and security; and (2) special circumstances are present. The requested exemption satisfies these criteria as described below.

Criterion 1

1. This exemption is authorized by law

   The requirements in 10 CFR 50 Appendix R, Subsection III.G.2 were adopted at the discretion of the NRC with its statutory authority. No statute required the NRC to adopt these requirements. Additionally, the NRC has the authority under 10 CFR 50.12 to grant exemptions from the requirements of 10 CFR 50 upon showing proper justification. Therefore, this exemption is authorized by law.

2. This exemption will not present an undue risk to public health and safety

   In accordance with the Limerick Methodology, as approved by the NRC in Reference 5, NSPM has determined that the structural steel will not reach the critical temperature of 1100°F. Furthermore, NSPM has performed fire modeling which demonstrates that exposed structural steel will not fail during postulated fires. These conclusions are further supported by the American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS) Standard, 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" (Reference 8). The ASME/ANS PRA standard directs the screening of exposed structural steel in the absence of high hazard fire sources (e.g., oil storage tanks, hydrogen storage tanks and piping, mineral oil-filled transformers). No such high hazard fire sources are contained within the areas pertinent to this request. Thus, NSPM will retain the ability to safely shutdown MNGP in the event of a fire and maintain it in a safe shutdown condition. Therefore, this exemption will not present an undue risk to public health and safety.

3. This exemption is consistent with common defense and security

   To ensure that the common defense and security are not endangered, the exemption request must demonstrate that the loss or diversion of special nuclear material (SNM) is precluded. NSPM has processes in place that provide protection for the public from diversion of SNM that is licensed to be possessed on site. These systems and processes are those embodied in the Physical Security Plan, Radioactive Material Security Plan, and the Security Implementing Procedures. The exemption request contained herein does not involve or affect the systems and processes contained in those documents/programs. Therefore, this exemption is consistent with the common defense and security.

Criterion 2

Special Circumstances Support the Issuance of an Exemption

10 CFR 50.12(a)(2) states that the NRC will not consider granting an exemption from the regulations unless special circumstances are present. The requested exemption meets the

special circumstance of 10 CFR 50.12(a)(2)(ii) which states that, “application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.” In this particular circumstance, application of the regulation is not necessary to achieve the underlying purpose of the rule.

The underlying purpose of 10 CFR 50, Appendix R, is to provide reasonable assurance that safe shutdown of the reactor can be achieved and maintained in the event of a single postulated fire in any plant area. The intent of III.G.2 is to ensure that one safe-shutdown equipment train remains free of fire damage and several options are provided to establish a level of protection that provides reasonable assurance of meeting that requirement. If such protection is not provided, an exemption from III.G.2 must be requested.

For Fire Zones 7A, 7B, 8, and 10, MNGP is required to comply with 10 CFR 50, Appendix R. The deterministic requirements of III.G.2 mandate that, using one of the options given, the redundant trains should be adequately separated and protected, such that in the event of a fire in that fire area, at least one train will remain free of fire damage. Contrary to the requirement, the structural steel in a portion of the floor of the Cable Spreading Room is not protected with fireproofing material to provide fire resistance equivalent to that of the barrier.

As described above, the intent of III.G.2 has been met by means other than the deterministic physical separation requirements. Instead, based on the Limerick Methodology, NSPM has determined that the structural steel will not fail in the event of a fire. This conclusion is further demonstrated by the results of fire modeling and the ASME PRA Standard’s screening of such structural steel. Because the structural steel will not fail, a fire that originates in Fire Zones 7A, 7B, or 10 will not propagate into Fire Zone 8. The existing barriers between Fire Zones 8 and 7A, 7B, and 10 provide protection commensurate with the fire hazards therein and ensure the safe shutdown strategy will be preserved. Thus, MNGP retains the ability to reach and maintain safe shutdown in the event of a fire in any plant area and protecting the exposed steel members would have no demonstrable safety benefit over current conditions. Therefore, the underlying purpose of the rule, which is to provide reasonable assurance that safe shutdown of the reactor can be achieved and maintained in the event of a single postulated fire in any plant area, is satisfied and the application of the deterministic requirements of III.G.2 in these particular circumstances is not necessary to achieve the underlying purpose of the rule.

5. CONCLUSION

NSPM is requesting a permanent exemption from the requirements of 10 CFR 50, Appendix R, Section III.G.2.a for the structural steel supporting a portion of the Cable Spreading Room floor. The structural steel was discovered to not be protected with fireproofing material to provide fire resistance equivalent to that of the barrier and, therefore, fails to meet the requirements of III.G.2.a. Based on the Limerick Methodology, NSPM has determined that the structural steel will not fail in the event of a fire. This conclusion is further demonstrated by the results of fire modeling and the ASME PRA Standard’s screening of such structural steel. The requested exemption meets the requirements in 10 CFR 50.12 in that it is authorized by law, will not present an undue risk to the health and safety of the public, is consistent with the

common defense and security, and special circumstances are present. In this case, compliance with the rule is not necessary to achieve the underlying purpose of the rule.

6. REFERENCES

1. Monticello Updated Safety Analysis Report (USAR) Subsection J.5, “Updated Fire Hazards Analysis”, Revision 35, dated September 29, 2017

2. Monticello USAR Subsection J.4, “Safe Shutdown Analysis”, Revision 35, dated September 29, 2017

3. NRC Letter to Iowa Electric Light and Power Company, “Exemption from Appendix R to 10 CFR Part 50 Concerning Separating Redundant Trains by 3-Hour Fire Barriers and Providing Automatic Fire Suppression and Detection Systems (TAC 55994)”, dated October 14, 1987 (Agencywide Document Access and Management System (ADAMS) Accession No. ML021900207)

4. NRC Letter to Philadelphia Electric Company, “Exemption from 10 CFR 50 Appendix R Regarding Dampers, Structural Steel and Automatic Fire Suppression”, dated December 31, 1986 (ADAMS Accession No. ML011360247)

5. NRC NUREG-0991, Supplement 2, “Safety Evaluation Report Related to the Operation of Limerick Generating Station, Units 1 and 2”, dated October 1984 (Legacy ADAMS Accession No. 8411090445)

6. NRC Generic Letter 83-33, “NRC Positions on Certain Requirements of Appendix R to 10 CFR 50”, dated October 19, 1983 (ADAMS Accession No. ML031080522)

7. NRC NUREG/CR-6850, “EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities”, Volumes 1 and 2, dated September 2005 (ADAMS Accession Nos. ML15767A401 and ML15167A411)

8. ASME Standard 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”, dated February 2, 2009