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Monticello Nuclear Generating Plant
Operated by Nuclear Management Company, LLC

November 17, 2003

L-MT-03-053
10 CFR 50.12

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

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

Exemption Request From The Requirements Of 10 CFR 50, Appendix R Section III.G.2
For Fire Area IX/Fire Zone 23A - Intake Structure Pump Room

In accordance with 10 CFR 50.12, Nuclear Management Company, LLC (NMC) hereby requests the NRC grant a permanent exemption from the requirements of 10 CFR 50, Appendix R, Section III.G.2.b as it applies to Fire Area IX/Fire Zone 23A at the Monticello Nuclear Generating Plant (MNGP). Fire Area IX/Fire Zone 23A corresponds to Intake Structure Pump Room at MNGP. In particular, NMC requests an exemption from the requirement for: *"Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards."*

NMC requests that an exemption be granted to MNGP as detailed in Attachment 1 of this letter. In this request, NMC has demonstrated that a level of protection equivalent to Section III.G.2 of 10 CFR 50, Appendix R, is provided for the Intake Structure Pump Room. NMC has reviewed this exemption request and has determined that it is not in conflict with other legal requirements, does not present an undue risk to the public health and safety, and does not endanger the common defense and security. As a result, NMC is confident that the exemption request conforms to the requirements of 10 CFR 50.12(a)(1).

Additionally, "special circumstances" exist for the requested exemption in that application of the regulation in this particular circumstance is not necessary to achieve the underlying purpose of Appendix R to 10 CFR 50 and compliance to the regulation would result in hardship and costs significantly in excess of those incurred by others similarly situated. As a result, NMC is confident that the exemption request also conforms to the requirements of 10 CFR 50.12(a)(2).

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Therefore, NMC respectfully requests that the NRC grant this exemption from the requirements of 10 CFR 50 Appendix R, Section III.G.2.b for Fire Area IX/Fire Zone 23A within one year of the submission of this request.

Summary of Commitments

This exemption request makes the following commitments:

1) Drain piping constructed of polyvinyl chloride and a high-density polyethylene drum located in Fire Area IX/Fire Zone 23A will be eliminated as intervening combustibles.

2) Cable trays YS4 and YB3 located in Fire Area IX/Fire Zone 23A will be individually covered with sheet metal on top and bottom from the electric fire pump control panel (C103) west to the end of the trays.

These commitments will be completed by the end of the next refueling outage after approval of the exemption request.

NMC requests approval of this exemption by November 2004.

If you have any questions please contact John Fields, Senior Regulatory Affairs Engineer (763-295-1663).

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Enclosure 1 – Exemption Request for the Intake Structure Pump Room

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
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ENCLOSURE 1

EXEMPTION REQUEST FOR THE INTAKE STRUCTURE PUMP ROOM

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Fire Area IX/Fire Zone 23A

TABLE OF CONTENTS

Section Title	Page #
A. Exemption Requested	1-3
B. Background	1-3
C. Safety Analysis/Technical Evaluation	1-4
1. Area Description	1-4
2. Barriers	1-5
3. Ventilation	1-5
4. Safe Shutdown Capability	1-6
5. Fire Hazards Analysis	1-7
D. Hazard Assessment	1-10
1. Fuel Oil	1-10
2. Lubricating Oil in Pump Motors	1-10
3. Intervening Combustibles	1-11
4. Transient Combustibles	1-15
5. Fire Water Supply	1-15
6. Risk Significance	1-15
E. Justification for Exemption Request – 10 CFR 50.12 Requirements	1-15
1. 10 CFR 50.12(a)(1)	1-16
2. 10 CFR 50.12(a)(2)	1-16
F. Conclusion	1-18
G. References	1-19

ENCLOSURE 1

A. Exemption Requested

10 CFR 50, Appendix R, Section III.G.2.b requires, *"Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; ..."*

In accordance with 10 CFR 50.12, Nuclear Management Company (NMC) requests the Nuclear Regulatory Commission (NRC) grant a permanent exemption from certain requirements of 10 CFR 50, Appendix R, Section III.G.2.b as it applies to Fire Area IX/Fire Zone 23A, Intake Structure Pump Room, at the Monticello Nuclear Generating Plant (MNGP). In particular, NMC requests an exemption from the requirement for: *"Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 ft with no intervening combustibles or fire hazards."* Although redundant safe shutdown components and cables within this fire zone are separated by more than 20 feet, permanent intervening commodities exist within the separating space.

This exemption request is related to fire protection features provided to comply with the aforementioned regulation and has no effect on power operation of the plant. No proprietary information is contained within this request.

B. Background

An exemption was previously requested for Fire Area IX/Fire Zone 23A (Intake Structure Pump Room) via Reference G.1. This correspondence requested an exemption from the requirements of 10 CFR 50 Appendix R, Section III.G.2.a in that a three-hour fire barrier did not separate redundant shutdown equipment.

Supplemental information in support of the exemption request was provided to the NRC via Reference G.2. This correspondence referred to an exemption from 10 CFR 50 Appendix R, Section III.G.2.b in that an automatic suppression system was not provided in the fire zone and minimal intervening combustibles existed between redundant shutdown equipment and cables.

NRC transmitted a draft Safety Evaluation (SE) to Northern States Power (NSP) via Reference G.3. This draft SE indicated that the exemption request for the Intake Structure Pump Room would be denied. Within this letter, NRC requested that NSP provide their plan of action for denied exemptions. For the Intake Structure Pump Room, NSP responded by submitting a compliance solution via Reference G.4. This solution identified that an automatic suppression system and fire stops to mitigate the effects of in-situ intervening combustibles would be installed in the fire zone.

The NRC formally denied the exemption request via Reference G.5.

In an effort to comply with Appendix R, Section III.G.2.b, NSP installed a pre-action sprinkler system throughout the fire zone. Thermal detection was provided throughout the fire zone as part of the installation. NSP also installed fire stops at two locations in two east/west running cable trays. The fire stops are constructed of ½ inch Marinite board, Kaowool and Flamemastic. They were intended to prevent fire propagation along the cable trays. This installation was performed in the 1983 time frame.

A plant modification was later performed that installed two additional Emergency Service Water (ESW) Pumps. This installation reduced the distance between ESW Division II and an intervening cable tray (YT4) from approximately 20 feet to approximately 15 feet.

In spite of the improvements made in the area, the requirements of Appendix R, III.G.2.b are not met because intervening combustibles, as detailed in the enclosed analysis, exist between redundant safe shutdown trains.

C. Safety Analysis/Technical Evaluation

1. Area Description

The Intake Structure is basically a chambered box of reinforced concrete construction. The walls and floor slabs are constructed of reinforced concrete. The roof of the structure is approximately 4-feet 3-inches above grade at the 934-foot 3-inch elevation and consists of reinforced concrete beam and slab framing with hatches above the pumps to facilitate removal for maintenance. Also mounted on the roof are the diesel fire pump house and the bleach house. The bleach house contains sodium hypochlorite system equipment.

The Intake Structure Pump Room, Fire Area IX/Fire Zone 23A, consists of a main floor section on the north side and the circulating water pump pit on the south side as depicted on Figure 1. The main floor is located at elevation 919 feet. It occupies approximately 2900 ft^2 and is approximately 13 feet 6 inches high. The circulating water pump pit is at floor elevation 899 feet. It occupies approximately 1100 ft^2 and is approximately 33 feet 6 inches high. Overall, the Intake Structure Pump Room occupies approximately 4000 ft^2 with a volume of approximately 74,000 ft^3.

Two Circulating Water Pump motors are located on the south side of the room. Three Service Water Pump motors, four Residual Heat Removal Service Water Pump motors, the Electric Fire Pump motor, and the Screen Wash/Fire Pump motor are located along the north wall. Four Emergency Service Water Pump motors, two Makeup Pump motors, two Seal Water Pump motors, the Fire System Jockey Pump, Motor Control Center (MCC) 123/113, Electric Fire Pump Control Panel, Screen Wash/Fire Pump Control Panel and other panels are also located in this fire zone. Two parallel cable trays run north/south and two

stacked cable trays run east/west. The east side of the room contains a vestibule and entry to the Intake Structure Tunnel. A flammable liquids storage cabinet is located in the vestibule. The arrangement of the fire zone is depicted on Figure 1, attached.

The only interior interface for Fire Zone 23A with the power block is via the Intake Structure Access Tunnel. The Access Tunnel is designated a different fire zone (23B), but is part of the same fire area (IX). The Access Tunnel is approximately 78 feet long. The fire load for Fire Zone 23B is approximately 13,000 Btu/ft^2. This is considered to be a low fire load.[1] Fire Zone 23B is approximately 50 feet at its closest point from the intervening combustible area of Fire Zone 23A. Due to the low combustible loading in Fire Zone 23B and its relative distance to the intervening combustible area of Fire Zone 23A, it is not considered likely that a fire will spread to the intervening combustible area of Fire Zone 23A.

Fire zone 23A is normally unoccupied and not subject to regular traffic. Typical activities within the space are walk down, inspection and minor maintenance. The room may be considered moderately congested. This is due to the amount of piping routed throughout. When not considering piping, the room may be considered sparsely occupied by equipment and cables.

2. Barriers

The majority of wall space in Fire Zone 23A is below grade. Walls consist of 21- to 36-inch-thick reinforced concrete. The ceiling is primarily 21-inch-thick reinforced concrete with removable equipment hatches made of concrete and steel above the pumps. The northeast corner of the ceiling bounds the Diesel Fire Pump Room above and is designated as a three-hour fire barrier. The floor of the fire zone is 24-inch-thick reinforced concrete. Below the floor is the river intake bay. Pump shaft assemblies and floor drains penetrate the floor. The north wall borders the Screen House. The northwest corner of the fire zone contains an emergency exit to the exterior traveling screen area. The southeast corner of the fire zone exits to the Intake Structure Access Tunnel through a partial height block wall and door. The separating wall and access door are not fire rated, since they are part of the same fire area.

3. Ventilation

The ventilation flow rate in the Intake Structure Pump Room is approximately 66,000 cfm as supplied by two fans that discharge to the circulating water pump pit. Given the overall size of the fire zone this is considered a moderate airflow.

[1] The Fire Protection Handbook, Eighteenth Edition, 1997, defines a low fire load as a fire load that does not exceed an average of 100,000 Btu/ft^2 of net floor area of any compartment, nor an average of 200,000 Btu/ft^2 in limited isolated areas.

Six small thermostatically controlled recirculating unit space heaters are distributed around the zone. The heat source for the heaters is heating steam. Cables to the fans are contained in conduit.

4. Safe Shutdown Capability

   a. Safe Shutdown Systems in Fire Area IX/Fire Zone 23A

      Cables and equipment for the following safe shutdown systems are contained within the area:

      - Residual Heat Removal Service Water (RHR SW)
      - Emergency Service Water (ESW)

   b. Systems and Equipment for Safe Shutdown

      - RHR SW (pump motors and power cables)

        11 RHR SW Pump P-109A (Division I)
        13 RHR SW Pump P-109C (Division I)

        12 RHR SW Pump P-109B (Division II)
        14 RHR SW Pump P-109D (Division II)

        Each RHR SW pump contains lubricating oil as described in Section 5, below. The RHR SW system provides for decay heat removal via the RHR Heat Exchangers. One RHR SW pump is analyzed to support post-fire shutdown.

      - ESW (pump motors and power cables)

        ESW Pump P-111A (Division I)
        ESW Pump P-111C (Division I)

        ESW Pump P-111B (Division II)
        ESW Pump P-111D (Division II)

        The ESW pumps contain no lubricating oil. P-111A and P-111B have greased bearings, while P-111C and P-111D have sealed bearings. The MNGP Safe Shutdown Analysis states that ESW provides cooling water to Emergency Diesel Generators, Core Spray pumps, RHR pumps and the pump room coolers. One division of ESW (two pumps) is analyzed to support post-fire shutdown. The RHR SW and ESW pumps supporting post-fire shutdown must be of the same division.

c. Separation Between Redundant Components Within Fire Area IX/Fire Zone 23A

For the purposes of this analysis, the RHR SW and ESW pumps will be discussed collectively as Division I or Division II unless otherwise noted. Also refer to Figure 1.

The redundant divisions are separated by approximately 25 feet at the nearest point. Power cables to the safe shutdown pump motors are routed in conduit for their full length within the zone as depicted on Figure 1 with the exception of ESW pump P-111A. This cable is routed in conduit along its north/south run and then in cable tray to the east as it exits the zone. Thus one division will be available for a fire in this area.

5. Fire Hazards Analysis

a. Type, Configuration and Quantity of Combustibles

The fire load for Fire Zone 23A is approximately 12,000 Btu/ft^2. This is considered to be a low fire load. [2]

The majority of fixed combustibles consist of lubricating oil in pump motors and cable insulation. Lube oil in pump motors accounts for approximately 57% of the combustibles in the zone. Figure 1 shows the location of the pump motors within the zone.

The approximate lubricating oil volumes for motors located in the fire zone are:

- Three Service Water Pump motors - 9 quarts each
- Electric Fire Pump motor - 5 quarts
- Screen Wash/Fire Pump motor - 5 quarts
- Two Make-Up Pump motors - 7 quarts each
- Four RHR SW Pump motors - 13 gallons each
- Two Circulating Water Pump motors - 38 gallons each

Cabling within the exposed cable trays is low voltage power and control cabling. The majority of the cable is not IEEE-383 qualified with regard to fire resistive properties. Cable insulation accounts for approximately 38% of the combustibles in the zone. Figure 1 depicts the layout of the cable trays. Two parallel cable trays (YT4 and YC3) traverse the zone from north to south at approximately the midpoint of the main pump room floor. Two stacked cable trays (YS4 and YB3) travel east to west along the south end of the main floor. The stacked trays traverse almost the entire width of the main floor and are routed over MCC 123/113 and the two fire pump control panels.

[2] See footnote 1 on page 1-5.

A 1-inch fuel oil fill line to the Diesel Fire Pump Day Tank is routed along the east wall of the main floor from the entry door to where it exits through the ceiling to the Diesel Fire Pump House. This pipe is normally depressurized and isolated. In addition, within the main floor and access tunnel, it is encapsulated in a 3-inch guard pipe. The guard pipe eliminates the fuel oil line as a hazard.

A flammable liquids storage cabinet is located in the vestibule. Polyvinyl chloride (PVC) drain piping and a high-density polyethylene drum associated with the bleach house floor drain system are located in the Intake Structure Pump Room. The liquid contents of the drum are not flammable; however, the PVC piping and drum are combustible.

Transient combustibles may consist of paper, plastic, solvents and lubricating oil, etc. This includes three fiberglass ladders, which are stored in the fire zone. Transient combustibles and potential hot work activities in this fire zone are administratively controlled by plant procedures.

b. Ease of Ignition and Propagation, and Heat Release Rate Potential

1. Lubricating Oil

Different weight lubricating oils are used in the pump motors. Typical motor lubricating oils exhibit flash points of 300°-450°F and auto ignition temperatures of 500°-700°F. Lubricating oils currently used for the subject pump motors possess flash points above 400°F. These temperatures are considered highly unlikely to achieve given that no heat source other than the pump motors themselves are in the vicinity of possible lube oil leaks. In addition, heat absorption provided by the concrete floor will tend to cool any leaking lube oil. In the extremely unlikely event that lube oil is involved in an exposure fire, the installed detection and suppression throughout the pump room will mitigate the potential fire spread and the deleterious effects of heat flux.

2. Cable

Cabling within the exposed cable trays is low voltage power and control cabling. The cable trays run along the ceiling. The lower tray of the east/west running stacked trays is approximately 10 feet from the floor. The two sets of cable trays form a "T" arrangement with the greatest concentration of cables at the intersection. As the east/west running cable trays approach the west side near the safe shutdown Division II conduits, the amount of cable in the trays significantly decreases.

A line of sprinklers exists in close proximity along the entire run of the east/west running cable trays. Thermal detectors are also aligned along the run of these trays. A line of sprinklers exists in close proximity to both

sides of the north/south running cable tray pair. Thermal detectors also exist in close proximity to both sides of the tray pair. In addition, an ionization detector is near the north end of tray YT4. This configuration prevents the potential for an undetected flame front to propagate along the length of either set of trays. In the unlikely event that a fire develops involving either set of cable trays, the location of detectors and sprinklers will result in a response that contains and suppresses the fire, thus forestalling development of a hot gas layer. The cooling effect of system activation prevents the formation of a hot gas layer at the ceiling by suppressing the fire plume, thus acting to control temperatures in the zone until the fire is fully extinguished.

c. Existing Fire Protection Features

- Detection

  One ionization detector is provided under each RHR SW Pump shroud, one in the vicinity of the SW Pumps and one in the Vestibule. Thermal detectors are provided throughout the zone for actuation of the suppression system.

- Automatic Suppression

  A pre-action sprinkler system is provided throughout the zone. The system design has been evaluated against the NFPA code of record and deviations have been evaluated as described in the guidance of NRC Generic Letter (GL) 86-10.

- Hose Stations

  Two 75-foot hose stations are located in the area, one on the east wall at the entry vestibule and the other on the west wall of the zone near the emergency exit.

- Extinguishers

  Portable dry chemical extinguishers are located on the east and west walls. A halon extinguisher is located approximately in the middle of the main floor area near panel C101.

- Fire Water Supply

  The diesel driven fire pump is independent of the fire area.

D. Hazard Assessment

The following discusses the hazards that exist in the fire zone and the potential impact on the ability to achieve post-fire safe shutdown. Commodities that intervene the space between redundant safe shutdown cables or components are discussed separately.

1. Fuel Oil

   The 1-inch fuel oil fill line to the Diesel Fire Pump Day Tank replaced a now abandoned in place 2-inch line that transited the fire zone from east to west and was considered a concern by the NRC in Reference G.6. As previously noted, this 1-inch line is routed along the east wall of the main floor from the entry door to where it exits through the ceiling to the Diesel Fire Pump House. This pipe is normally depressurized and isolated. In addition, within the main floor and access tunnel, it is encapsulated in a 3-inch guard pipe. The guard pipe eliminates the fuel oil line as a hazard within the fire zone. This design was reviewed by the NRC and found acceptable as documented in Reference G.7.

2. Lubricating Oil in Pump Motors

   As previously noted, lubricating oils with flash points above 400°F are used in the pump motors. The flash point temperatures are considered highly unlikely to achieve, given that no heat source other than the pump motors themselves are in the vicinity of possible lube oil leaks. In addition, heat absorption provided by the concrete floor will tend to cool any leaking lube oil. Nonetheless, for the purposes of this discussion, it will be assumed that leaking lube oil has the potential to ignite.

   The RHR SW pump motors each contain approximately 13 gallons of lubricating oil. The pumps do not normally run. A shroud that extends to the ceiling covers each pair of RHR SW pump motors. An ionization detector is provided within each shroud. In the unlikely event that lube oil leaks from a pump motor and begins to smolder or ignites, the under-shroud detector will provide an alarm to the Control Room. In addition, thermal detectors and sprinklers exist in close proximity to the pairs of pumps. Actuation of the sprinkler system will also alarm in the Control Room. Upon receipt of an alarm in the Control Room, the operators will summon the fire brigade. Therefore, any fire of significance that may ensue will be detected and suppressed.

   The Circulating Water Pumps are set off from the main pump floor and are at a lower elevation as previously noted. Each pump motor contains 38 gallons of lubricating oil. Both pumps are running when the plant is at full power. Thermal detectors and a number of sprinklers are placed around each pump. In the unlikely event that an oil leak occurred and spilled to the floor, it would be contained within the circulating water pump pit. In the event the oil ignited, the automatic suppression system would actuate to extinguish the fire. Therefore,

the geometry and floor elevation of the pit coupled with the automatic suppression system would prevent fire spread to the main floor of the pump room.

Fire spread from the main pump floor to the Circulating Water Pump pit due to leaking lubricating oil is not of concern due to the array of sprinklers and detectors between the pumps on the north side of the main floor and the pit.

The remaining pump motors containing oil are discussed as intervening combustibles.

3. Intervening Combustibles

As noted above, safe shutdown divisions are separated by a minimum of approximately 25 feet. This is the distance between redundant divisions of ESW pumps. Separation distances for the remaining components and cables are greater as can be observed from Figure 1. The following assesses the combustibles that exist within the 25-foot zone.

The following commodities exist within the 25-foot horizontal separation zone between the two safe shutdown divisions:

- Two SW Pump motors
- Electric Fire Pump motor
- Screen Wash/Fire Pump motor
- Two Make-Up Pump motors
- PVC Drain Lines and Drum
- Two parallel north/south traveling horizontal cable trays (YT4 and YC3)
- Two stacked east/west traveling horizontal cable trays (YS4 and YB3)
- MCC 123/113
- Electric Fire Pump Control Panel C103
- Screen Wash/Fire Pump Control Panel C115
- Circulating Water Control Panel C101

a. Lube Oil in Pump Motors

- Service Water and Fire Pump Motors

Protection against the effects of postulated lube oil ignition from a Service Water or Fire Pump motor leak is provided by the early warning ionization detector in the vicinity of the pumps, and the installed thermal detector actuated automatic suppression system. A line of sprinklers is installed along the entire row of pumps along the north wall of the fire zone. These measures of protection will provide notification to the control room via the smoke detector, or actuation of the suppression system via the thermal detection, and suppression of the fire via activation of sprinklers. Suppression system actuation is also alarmed in the Control Room. Given

the installed protection, the hazard presented by these pump motors to the ability to achieve safe shutdown is minimal.

- Make-Up Pumps

  The Make-Up pumps are normally idle. Thermal detectors and sprinklers are located near the pumps. In the unlikely event that lube oil leaks from a motor and is involved in a fire, the detection and suppression systems will act to prevent fire spread to redundant safe shutdown cables or components.

b. PVC Drain Piping and Drum

PVC drain piping and a high-density polyethylene drum exist in the vicinity of stacked cable trays YS4 and YB3, MCC 123/113 and the Electric Fire Pump Control Panel. The drain piping and drum are associated with the sodium hypochlorite system equipment located on the roof of the Intake Structure. The PVC piping will be replaced with non-combustible piping; given the burning characteristics of plastics and the risk they present to fire propagation. The drum will either be relocated outside the separation zone or be replaced with a non-combustible commodity.

c. Cable Insulation

As previously noted, cable insulation comprises approximately 38% of the combustible load in this fire zone. The cabling of concern is contained in the parallel north/south running trays YT4 and YC3, and east/west running trays YS4 and YB3. Cable in these trays is typically not IEEE-383 qualified with regard to fire resistive properties. The heaviest loading of the cable trays is where they meet at a "T" configuration. The concentration of cable loading diminishes toward the north and west ends of the cable trays. It is important to note the light loading at the west end of trays YS4 and YB3 as the fire propagation concern for this zone is in the east/west direction.

The horizontal separation between ESW pump P-111D and tray YT4 is approximately 15 feet. Two rows of sprinklers interpose between the ESW pump and the cable tray. Thermal detectors also exist in the vicinity of the cable tray. In addition, any fire that may involve the cable tray and propagate along its length would travel north/south. Given that the critical propagation distance is east/west, sprinklers interpose the separation distance to the ESW pump and thermal detection is in proximity of trays YT4 and YC3, they do not pose a threat to the Division II shutdown equipment.

Stacked cable trays YS4 and YB3 travel east/west traversing almost the entire zone. On the east side of the tray runs, the ESW pump P-111A power cable is routed in tray. On the west side, the trays do not contain any safe shutdown related cables. However, they terminate in close proximity to safe

shutdown Division II conduits. The trays run above MCC 123/113, and both fire pump panels. These trays are of concern since they travel east/west, which is the critical fire propagation direction. A line of sprinklers in close proximity to the trays runs east/west along the entire length. In addition, thermal detection also exists in close proximity of the trays.

Cable trays YS4 and YB3 will each be enclosed on the top and bottom with sheet metal from the point of the electric fire pump control panel (C103) west to the end of the trays. This will minimize the risk that cables in these trays present as intervening combustibles. The fire stop at the west end of the trays will be removed and the trays will be enclosed with sheet metal on the west end. The east end above the electric fire pump control panel will remain open. The annular gap around commodities penetrating the tray covers will be covered with a mastic type material, fire resistive caulk, or metal tape as appropriate. The solid sides of the trays will make-up the remainder of each enclosure.

Fire tests sponsored by the NRC documented in NUREG/CR-0381, "A Preliminary Report on Fire Protection Research Program Fire Barriers and Fire Retardant Coatings Test," indicate that solid metal barriers offer a measure of protection to cables. Non-IEEE 383 qualified cables in stacked trays with solid bottoms, or solid bottoms with vented top covers, or solid top covers with no bottom cover required more than one burner ignition cycle to initiate fire in the trays. In no case did fire propagate from the lower cable tray to the upper cable tray. Therefore, providing top and bottom covers for the noted trays will reduce the potential for ignition of, and subsequent flame spread along, cables contained within.

NRC GL 86-10, Enclosure 2, Section 3.6, identifies that cables in enclosed trays should be considered as intervening combustibles. It further states:

> *"However, cables coated with a fire retardant material, or cables in cable trays having solid sheet metal bottom, sides and top, if protected by automatic fire detection and suppression systems, and if the design is supported by a fire hazards analysis, have been found acceptable under the exemption process."*

The loading of trays YS4 and YB3 significantly diminishes toward the west end. Therefore, any potential fire that may involve these cable trays will significantly diminish if it travels west. The sheet metal covers will also serve to limit the intensity of a potential fire. The covers in conjunction with the diminishing cable concentration as the trays travel west, along with the thermal detection and automatic suppression assure that any fire involving the trays will be detected, contained and suppressed by the noted fire protection features prior to becoming a threat to safe shutdown Division II cables.

The analysis provided within this exemption request serves to provide the aforementioned fire hazards analysis identified in GL 86-10 above.

d. Electrical Cabinets

- MCC 123/113 and Electric Fire Pump Control Panel C103

  MCC 123/113 interposes the space between redundant shutdown cables. This is a non-vital MCC that supplies loads within the Intake Structure complex. The electric fire pump control panel, C103, adjoins the MCC on its west side. The nearest Division II safe shutdown conduits on the west side of the main pump room floor are approximately 14 feet away.

  The nearest Division I safe shutdown conduit is approximately 5 feet southeast of the east end of the MCC. Sprinklers and thermal detectors exist in close proximity to the MCC and Panel C103. The Electric Fire Pump does not normally run because either the jockey pump or Screen Wash/Fire Pump maintains fire system pressure. A fire that would originate within either the Panel C103 or MCC 123/113 would be due to an electrical fault. Electrical circuit protection would prevent the fault from being sustained. In the unlikely event that a fire of significance developed and breached the panel or MCC confines, the automatic suppression system will respond to provide containment.

- Screen Wash/Fire Pump Control Panel C115

  The Screen Wash/Fire Pump control panel C115 is installed between the electric fire pump control panel C103 (approx. 8.5 feet) and the Division II safe shutdown cables (approx. 5.5 feet horizontally). It is approximately 24 feet from the nearest Division I safe shutdown cable. The Screen Wash/Fire Pump may be running because it is used to remove debris from the traveling screens when the plant is operating. Thermal detectors and sprinklers exist in close proximity to the panel. A fire that originated within Panel C115 would be due to an electrical fault. Electrical circuit protection would prevent the fault from being sustained. In the unlikely event a fire of significance developed and breached the panel confines, the automatic suppression system will respond to provide containment.

- Circulating Water Panel C101

  Circulating Water Panel C101 measures 5 feet by 2 feet by 7 feet. It contains low voltage instrumentation and wiring. The front face of the panel is solid with the exception of annunciator windows, gauges, electrical control switches, etc. The rear of the panel contains two normally closed doors with small louvers near the top of each. Thermal detectors and sprinklers exist in close proximity to the panel. Given the

low voltage circuitry within the panel and its "closed" construction, and the nearby detectors and sprinklers, it is not considered a hazard.

4. Transient Combustibles

In accordance with GL 86-10, Enclosure 2, Section 3.6.2, transient materials are not considered as an intervening combustible. This includes three fiberglass ladders, which are stored in the fire zone as indicated in Figure 1. Transient combustibles and potential hot work activities in this fire zone are administratively controlled by plant procedures.

5. Fire Water Supply

The Electric and Screen Wash/Fire Pumps are located in close proximity to each other. It can be assumed that a single fire could disable both pumps. The Diesel Fire Pump is located in a separate fire area above the Intake Structure Pump Room. The Diesel Fire Pump is designed to start on low system pressure even with a loss of AC power. Its starting control circuitry is DC powered and is self-contained within the Fire Pump House. In addition, the capacity of the pump exceeds the flow requirement of the Fire Zone 23A suppression system and hose use combination. The delivery capacity of the Diesel Fire Pump for a fire in Fire Zone 23A has been previously reviewed by the NRC and found acceptable in Reference G.8.

The Fuel Oil Day Tank in the Diesel Fire Pump House is required by procedure to contain a level of fuel oil that corresponds to an 8-hour supply. Consequently, in the event of a fire in the Intake Structure Pump Room, the Diesel Fire Pump is self-sufficient for approximately eight hours.

6. Risk Significance

The Monticello Individual Plant Examination of External Events (IPEEE) has identified the core damage frequency (CDF) contribution due to a fire in the Intake Structure Pump Room as 2.00E-8. This contribution is considered not risk significant.

E. Justification for Exemption Request - 10 CFR 50.12 Requirements

10 CFR 50.12(a) identifies that the Commission may grant an exemption from the requirements of 10 CFR 50 provided certain criteria are met. The requested exemption from the requirements of 10 CFR 50 Appendix R, Section III.G.2.b meets the criteria of 10 CFR 50.12 as discussed below.

ENCLOSURE 1

1. 10 CFR 50.12(a)(1) – Authorized by law

   The requested exemption does not present an undue risk to the public health and safety nor will it endanger the common defense and security, for the reasons stated below.

   - Greater than 20 feet of separation exists between redundant safe shutdown components and cables
   - Low fire load in the zone minimizes the potential for a fire to start and/or propagate
   - Installed ionization detection above the RHR SW and Service Water pumps provides early warning of a fire and provides an alarm to the Control Room
   - An automatic pre-action sprinkler system actuated by thermal detection is provided throughout the fire zone with heads in close proximity of cable trays and other commodities that intervene the space between redundant safe shutdown components and cables
     - As part of the suppression system, two rows of sprinklers exist between cable trays YT4 and YC3 and the safe shutdown Division II components/cables
     - A line of sprinklers exists in close proximity of stacked cable trays YS4 and YB3
   - Cooling effect of suppression system actuation prevents development of hot gas plume
   - Activation of the pre-action valve via the thermal detectors results in a "system actuated" signal to the Control Room
   - The area is not normally occupied nor is it a thoroughfare
   - Transient combustibles and hot work in the area are administratively controlled
   - Fire in this zone was determined to be an insignificant contributor to CDF per the IPEEE report

   The noted installed features in combination with the previously modifications assure that in the unlikely event of a fire in Fire Area IX/Fire Zone 23A (Intake Structure Pump Room), one safe shutdown division will be available to support post-fire shutdown. Consequently, further elimination of intervening combustibles would not provide a significant enhancement to the existing fire protection features. It can be concluded that the level of fire safety provided in the Intake Structure is equivalent to the technical requirements of 10 CFR 50 Appendix R, Section III.G.2.b.

2. 10 CFR 50.12(a)(2) - Special circumstances are present

   a. 10 CFR 50.12(a)(2)(ii) – *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*

The discussion in Section 1 above demonstrates that the public health and safety, and the common defense and security are not endangered given the attributes of the fire zone and committed modifications. The discussion also serves to substantiate that the underlying purpose of the rule is met in that sufficient detection and automatic suppression systems are available to ensure that one train of safe shutdown equipment will be available if a fire occurs in Fire Area IX/Fire Zone 23A.

b. 10 CFR 50.12(a)(2)(iii) - *Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated*

For this fire zone, full compliance to the rule would require significant relocation of the permanently installed equipment, piping and cabling necessary to support plant operation identified above as intervening in the space between redundant safe shutdown components and cables. Significant hardship and cost would be incurred for a negligible increase in fire safety for the area. In addition, the configuration of these intervening combustibles along with the installed fire suppression and detection features have been determined herein not to create an undue risk.

In addition, the NRC has previously approved similar exemption requests associated with intervening combustibles at other facilities. Three examples are:

- Minimum separation of redundant safe shutdown equipment and cables is 14 feet, intervening cable trays routed perpendicular to redundant trains providing a continuous path of combustibles, are covered with sheet metal on top and bottom, single layer of ceramic fiber blanket on top of cables in intervening trays, fire breaks installed at the end of intervening trays, detection and automatic suppression provided (Reference G.9).

- Separation of redundant components (cables, valves and instruments) necessary for achieving hot shutdown in the Reactor Building exceeds 20 feet, with intervening cables in cable trays. No installed detection or suppression systems indicated. (Reference G.10).

- Licensee increased the quantity of intervening combustibles from 16 minutes to a value not to exceed a 1-hour fire loading. The fire area contains intervening combustibles that include cable trays and lubricating oil for three pumps. Fire protection features for the fire area include cross-zoned fire detection, a partial suppression system, and a portable fire extinguisher, with fire extinguishers and fire hose stations in adjacent areas. (Reference G.11).

F. Conclusion

The above evaluation and discussion substantiates the validity of the requested exemption from 10 CFR 50 Appendix R, Section III.G.2.b for Fire Area IX/Fire Zone 23A, Intake Structure Pump Room. The following attributes of the area support a basis for approval of the requested exemption:

- Greater than 20 feet of separation between redundant safe shutdown components and cables
- Installed early warning ionization detection above the RHR SW and Service Water pumps provide an alarm to the Control Room
- Activation of the pre-action valve via the thermal detectors results in a "system actuated" signal to the Control Room
- The area is not normally occupied nor is it a thoroughfare
- Transient combustibles and hot work in the area are administratively controlled
- The fire load in the zone satisfies the criteria for a low fire load designation
- A postulated fire in the zone is an insignificant CDF contributor as analyzed by the IPEEE report

In addition, the following previously discussed modifications will be performed:

- PVC drain piping and high-density polyethylene drum will be eliminated as intervening combustibles
- Cable trays YS4 and YB3 will be individually covered with sheet metal on top and bottom from the electric fire pump control panel (C103) west to the end of the trays

These features assure that in the unlikely event of a fire in the Intake Structure Pump Room, one train of safe shutdown equipment will be available to support post-fire safe shutdown. Consequently, the relocation of permanently installed equipment, piping and cabling necessary to support plant operation identified above as intervening the space between redundant safe shutdown components and cables would not provide a significant enhancement to the existing fire protection features. Consistent with the precedents cited above, the level of fire safety provided is equivalent to the technical requirements of 10 CFR 50 Appendix R, Section III.G.2.b.

G. References

1. Northern States Power letter to NRC, "Fire Protection and Safe Shutdown Analysis for Meeting the Requirements of Appendix R, Section III.G.2, Including Exemption Requests," dated June 30, 1982.

2. Northern States Power letter to NRC, "Clarification of Information Provided in Support of Request for Relief from Requirements of 10 CFR Part 50, Appendix R, Section III.G," dated October 28, 1982.

3. NRC letter to Northern States Power, "Draft Safety Evaluation on Appendix R Exemption Request," dated January 12, 1983.

4. Northern States Power letter to NRC, "Review of Draft Safety Evaluation on Appendix R Exemption Requests," dated February 14, 1983.

5. NRC letter to Northern States Power, "Exemption Requests – 10 CFR 50.48 Fire Protection and Appendix R to 10 CFR Part 50," dated June 16, 1983.

6. NRC letter to Northern States Power, "Amendment 41 to Provisional Operating License No. DPR-22," Enclosure 2, "Fire Protection Safety Evaluation Report by the Office of Nuclear Reactor Regulation," dated August 29, 1979.

7. NRC letter to Northern States Power, "Amendment 1 to Facility Operating License No. DPR-22," Enclosure 2, "Supplement 1 to Fire Protection Safety Evaluation Report by the Office of Nuclear Reactor Regulation," dated February 12, 1981.

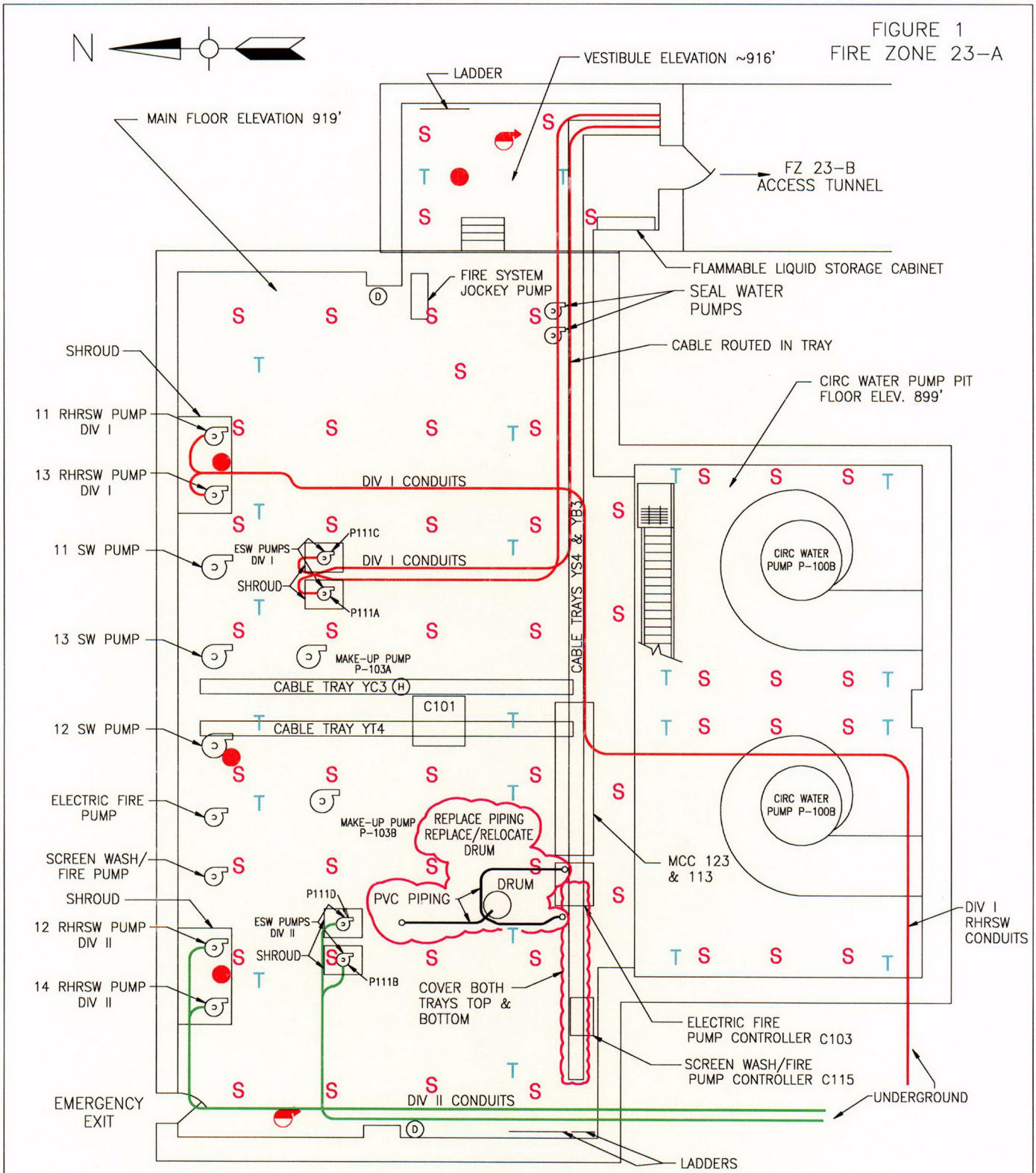
8. NRC letter to Northern States Power, "Fire Protection Safety Evaluation Open Items," dated October 2, 1985.

9. NRC letter to Wisconsin Electric Power Company, "Point Beach Nuclear Plant, Unit Nos. 1 and 2 – Issuance of Exemption From Certain Technical Requirements of Appendix R to 10 CFR Part 50," dated July 18, 1995.

10. NRC letter to Duke Power Company, "Exemption from The Fire Protection Requirements of Section III.G of 10 CFR Part 50, Appendix R (TACs 52674/52675/52676)," dated August 21, 1989.

11. NRC letter to Carolina Power & Light Company, "Exemption from Requirements of Section III.G.2 of Appendix R of 10 CFR Part 50 – H. B. Robinson Steam Electric Plant Unit No. 2 (TAC No. 77310)," dated October 17, 1990.

FIGURE 1
FIRE ZONE 23–A



INTAKE STRUCTURE PUMP ROOM

- HOSE STATION
- (H) – HALON EXTINGUISHER
- (D) – DRY EXTINGUISHER
- IONIZATION (SMOKE) DETECTOR
- T – THERMAL DETECTOR
- S – SPRINKLER

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