Northern States Power Company

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January 23, 1984

Director
Office of Nuclear Reactor Regulation
U S Nuclear Regulatory Commission
Washington, DC 20555

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

Exemption Requests to the Requirements of Appendix R to 10 CFR 50

Attached for your review and approval are 40 copies of documents which request specific exemptions from Appendix R to 10 CFR 50 or provide information on the approach which Northern States Power has taken in complying with the intent of Appendix R.

Attachment 1 is a Technical Exemption Request which resulted from the staff's clarification of the definition of intervening combustibles to include IEEE-383 Qualified Cables in its Generic Letter 83-33.

Attachment 2 is a Schedular Exemption Request which is necessary due to the safety concerns of cable derating and structural adequacy which were raised during the design of one-hour cable wraps to meet the requirements of Appendix R.

Finally, Attachment 3 provides a description of the Reactor Coolant Pump Lube Oil Collection System required by Section III.O of Appendix R. It is intended as information for the Staff related to the manner in which Northern States Power is complying with this portion of the rule.

Please contact us if you have any questions or additional information is necessary.

David Musolf
Manager - Nuclear Support Services

DMM/TAP/bd

c: Secretary of the Commission (orig + 2 copies)
Regional Admin-III, NRC
Project Manager, NRC
Resident Inspector, NRC
G Charnoff

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Enclosures

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UNITED STATES NUCLEAR REGULATORY COMMISSION

NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Docket No. 50-282
50-306

LETTER DATED JANUARY 23, 1984
REQUEST FOR RELIEF FROM THE REQUIREMENTS OF
10 CFR PART 50, SECTION 50.48 (c), FIRE PROTECTION

Northern States Power Company, a Minnesota corporation, by this letter dated January 23, 1984 hereby submits requests for exemption from the requirements of 10 CFR Part 50, Section 50.48 (c).

This letter contains no restricted or other defense information.

NORTHERN STATES POWER COMPANY

By /s/ David Musolf
David Musolf
Manager - Nuclear Support Services

On this 23th day of January, 1984 before me a notary public in and for said County, personally appeared David Musolf, Manager - Nuclear Support Services, and being first duly sworn acknowledged that he is authorized to execute this document on behalf of Northern States Power Company, that he knows the contents thereof and that to the best of his knowledge, information and belief, the statements made in it are true and that it is not interposed for delay.

/s/ Betty J. Dean
Betty J. Dean
Notary Public - Minnesota
Ramsey County
My Commission Expires Dec. 16, 1987

FIRE AREA 1: Containment - Unit 1 All Elevations

FIRE AREA 71: Containment - Unit 2 All Elevations

I. EXEMPTION REQUEST

Per the provisions of 10 CFR 50.48 (C)(6) and 10 CFR 50.12 Northern States Power Company requests exemption from the requirements of Appendix R, Section III.G.2 that noninerted containments have greater than 20 feet of horizontal separation between cables and equipment and associated non-safety circuits of redundant trains with no intervening combustibles, installation of an automatic fire suppression system, or separation of cables and equipment and associated non-safety circuits of redundant trains by a non-combustible radiant energy shield.

II. BASIS FOR EXEMPTION REQUEST

1. Fire loadings in Fire Area 1 and Fire Area 71 are 22,170 btu/ft^2 and 22,571 btu//ft^2, respectively. This equates to a fire severity of approximately 16 minutes.

2. The fire loading is comprised of three types of combustibles, IEEE-383 qualified cable, Mobil 824 Snythetic Lube Oil and fire retardant wood storage containers for the vessel head O-rings.

3. The three types of combustibles are in three areas of concentration. The lube oil being contained in the Reactor Coolant Pumps and the cable at the containment penetrations and surrounding areas. These two concentrations are separated by a 3 foot thick concrete wall equivalent to a greater than 3 hour fire barrier. The storage containers are located adjacent to the equipment hatch more than 30' away from the nearest electrical penetrations.

4. The electrical penetrations Division A and Division B enter the containment no higher than the 729' elevation. The penetrations are the highest point inside containment at which any safe shutdown cable is located. The wall separating the penetrations from the Reactor Coolant Pump Lube Oil runs continuously from grade to the 762' elevation. In addition to the 33' of separation between the electrical penetrations and the point where hot gases and smoke resulting from a lube oil fire would exit the enclosure around the Reactor Coolant Pumps there is an additional 130' of elevation in the containment to allow stratification and cooling of the hot gases.

5. The possibility of a fire resulting from ignition of the lube oil in the Reactor Coolant Pumps is extremely remote due to the use of Mobil 824 Synthetic Lube Oil which has a flashpoint of 480°F and ignition point to fire of 520°F. The Reactor Coolant Pumps are also equipped with a seismically qualified lube oil collection system which in the event of a leak would carry the lube oil away from any sources which could ignite it.

6. Transient combustibles are not normally allowed inside containment during operation. Access is limited during operation. An individual must pass thru Access Control which is manned 24 hours a day by 2 guards and must notify the Control Room prior to entering with reason for entry. When access into containment is actually made, it is alarmed in the Control Room.

   Administrative Control Directives limit the amount of transient combustibles in containment or other safety related areas. All work requires a fire hazards review and appropriate action taken if a hazard is identified. A revision to the Administrative Control Directives is in progress which will require as a minimum, a dedicated fire watch armed with a fire extinguisher.

7. Administrative Control Directives require a walkdown and sign-off of the containment after refueling to check for combustibles prior to closing up.

8. All cable inside containment is qualified to IEEE-Std-383. The cable has a high resistance to flame propagation and excellent flame retardance qualities.

9. Each of the four floor levels of containment contains a fire detection zone which is alarmed in the Control Room. Each floor contains two hose stations which during operation would have cooling water available to them via manual cross connect valves.

III. SUMMARY EVALUATION

Transient combustibles inside containment are carefully restricted during operation[1] and the potential for a lube oil fire in the area of the Reactor Coolant Pumps is extremely remote due to the nature of the Mobil Synthetic Lube Oil and the existance of a lube oil leak collection system. In the remote event that a fire did occur, the vertical separation of 33' between where heat escapes the enclosure around the Reactor Coolant Pumps and the safe shutdown equipment of concern with the heat source being above the equipment, and the existence of the large volume of the containment above that point for stratification and cooling of the hot gases to occur, the possibility of the fire spreading to safe shutdown cable and equipment is not credible. If the fire did spread to this electrical penetration area, the possibility of damage is further reduced when it is considered that all cable in the containment is IEEE-383 qualified. As such, the separation of the redundant divisions of safe shutdown cable and equipment by 20' of horizontal separation with no intervening combustibles, by separation utilizing a non-combustible radiant energy shield, or by the installation of an automatic suppresion system would not enhance protection provided to safe shutdown equipment within the containment.

[1] Since operation began, only a few times has it been necessary to have a transient combustible inside containment during operation. In most cases, this was to add under 2 gallons of lube oil to the Reactor Coolant Pump. The situation necessitating the addition of lube oil has since been corrected. The only other times were during installation of the TMI modifications which necessitated running of conduit during operation. A one pint can of the zinc loaded paint was used at those times.

Schedular Exemption Request

Fire Protection Rule Schedular Requirements

I. EXEMPTION REQUEST

Per the provisions of 10 CFR 50.12, Northern States Power requests exemption from the schedular requirements of 10 CFR 50.48 paragraph C. The modification for which schedule relief is requested is the Cable Wrapping for both Units 1 and 2.

II. BASIS FOR EXEMPTION REQUEST

Under our Technical Exemption Requests addressing Fire Areas 31, 32, 58, 59, 73 and 74, Northern States Power committed to wrapping portions of cable trays in an approved one hour fire barrier. The Technical Exemptions Request were subsequently reviewed and approved by the NRC Staff. The tolling period under 10 CFR 50.48 (c)(6) was ended on May 4, 1983, requiring completion of the cable wrapping by February 4, 1984. In order to proceed with the cable wrapping modification, two safety issues required resolution; the effect of insulative wrapping on cable rating and the adequacy of tray or ladder support of the additional weight due to wrapping.

Results of a cable derating study completed in October 1983 indicated that electrical loading of instrumentation and control cables in trays would not exceed the derated capacity of these cables, but that loading of many power cables in ladders would exceed the derated capacity of the cables. These results indicated the need for more detailed study to determine the modifications to power cables that would provide sufficient derated capacity to allow wrapping. This additional study was completed for areas 58 and 59 in December and the requisite power cable rerouting or replacement was completed during the Unit 1 December 1983 refueling outage. The detailed study is in progress in the remaining areas. Results of the initial study indicated a need to review those power cables in conduit. This review is in progress for all areas.

Preliminary results of the tray and ladder mechanical support study received in January, 1984 indicated that all 24" wide instrumentation and control cable trays would require additional longitudinal support and that a number of power cable ladders would require additional lateral support.

The above studies and modifications must be completed prior to cable wrapping. Design Change processing for wrapping of instrumentation and control cable trays of less than 24" width has commenced. Wrapping of instrumentation and control cable trays, 24" width, will follow design and installation of longitudinal supports. Wrapping of power cable ladders in areas 58 and 59 will follow design and installation of the additional lateral supports.

Wrapping of power cable ladders in areas 31, 32, 73 and 74 will commence subsequent to support design and installation in those cases where cable derating does not require cable modification. Further cable modification, rerouting or replacement, will be completed during the Unit 2 refueling outage scheduled for September, 1984 with subsequent wrapping. Scheduled completion of all cable wrapping is December 31, 1984.

III. SUMMARY EVALUATION

In summary, Northern States Power has made an extensive effort toward complying with the rules of Appendix R. In making modifications, careful consideration must be given to not compromising any safety margins such as the cable ratings on wrapped cable trays. This, however, requires more time than we originally anticipated. Therefore, extension of the completion date for wrapping of cables is requested to December 31, 1984.

Reactor Coolant Pump

Lube Oil Collection System

As part of Northern States Power review and upgrading of the Fire Protection Program to the requirements of Appendix A to Branch Technical Position 9.5-1 a seismic category I lube oil collection system design was reviewed and approved by the NRC (see letters dated 9/6/79 and 4/21/80 from A Schwencer, Chief, Operating Reactors Branch #1, Division of Operating Reactors to L O Mayer, Northern States Power). This attachment is intended to provide the details of that system. It is Northern States Power's understanding that the lube oil collection system, as it now exists, meets the intent and is in compliance with Section III.O of Appendix R to 10 CFR 50.

DESCRIPTION

Prairie Island Units 1 and 2 have 2 Reactor Coolant Pumps each. For purposes of this description the units are identical. Each Reactor Coolant Pump contains 265 gallons of lube oil for a total of 530 gallons per unit. The lube oil is Mobil Synthetic lube oil which has a flash point of 480°F and an ignition point of 520°F. A series of drip pans and deflectors are located around the pump such that leakage from all potential pressurized and unpressurized leakage sites in the Reactor Coolant Pump lube oil systems are collected and piped, to the adjacent floor drain which empties into Sump A in the basement of the containment. Sump A is a concrete open pit, covered with grating, built into the floor which has a capacity of 990 gallons. There is no Safe Shutdown Equipment in the area surrounding the Reactor Coolant Pumps or Sump A. Sump A is designed to automatically pump down when the level of the tank reaches the 695'-9" elevation. (The bottom of the sump is at 693'-6") This is at approximately the 555 gallon point. If level continued to rise due to failure of the automatic pumping function, an alarm would sound in the Control Room at the 696'-9" level of the sump, approximately 800 gallons. An operator can then initiate manual control of the sump pump for pumping down. The top of the sump pit is at floor level, the 697'-6" elevation which represents the 990 gallon maximum capacity point of the sump. In addition to the automatic function, operators may at any level manually control the pump to pump down the sump. The sump is normally lined up to pump to the aerated sump tank in the Auxiliary Building which has a capacity of 600 gallons. The aerated sump tank is a vented closed tank. The aerated sump tank then pumps to the aerated drain tanks in the Auxiliary Building. Each aerated drain tank has a capacity of 1000 gallons for a total capacity of 2000 gallons. The aerated sump tank and drain tanks serve both units. The aerated drain tanks are vented closed tanks. The capability also exists to pump from the aerated sump tank to the 25,000 gallon waste hold-up tank which is also a vented closed tank.

A decision was made during design and installation (1978) of the collection system to not install a vented closed collection tank inside containment because, in addition to its function as a lube oil collection system, the drip pans serve to collect seal leakage to prevent the spread of contaminated water. If a tank was utilized, its capacity to accept lube oil could be limited because of water from seal leakage being present in the tank. If a large quanity of oil was introduced quickly into the tank with water present, it would overflow through the vent into the floor drains to the sump. It was therefore decided it would be better to deliver the leakage directly to the sump via the floor drain system. Since the sump automatically pumped down to a vented closed tank, this option was chosen.