PDR

Docket No. 50-285 July 3, 1985

LCR 016

Mr. R. L. Andrews, Division Manager
Nuclear Production
Omaha Public Power District
1623 Harney Street
Omaha, Nebraska 68102

Dear Mr. Andrews:

Subject: EXEMPTION REQUESTS FOR THE FORT CALHOUN STATION, UNIT NO. 1
10 CFR PART 50, APPENDIX R, FIRE PROTECTION PROGRAM FOR NUCLEAR POWER FACILITIES OPERATING PRIOR TO JANUARY 1, 1979

The Commission has issued the enclosed Exemption from certain requirements of Appendix R to 10 CFR Part 50 in response to your letters of August 30, 1983, December 3, 1984, January 9, 1985, and March 8, 1985.

The location, fire area, pertinent section of Appendix R, and disposition of the exemptions requested are summarized as follows:

1. Charging Pump Room (Fire Area 10):

   III.G.2, request for exemption from the requirement that systems associated with redundant shutdown divisions be completely separated by a continuous 1-hour fire-rated barrier and the fire area containing these systems be protected by an area-wide automatic fire suppression system. Not needed

2. Containment (Fire Area 30):

   III.G.2, request for exemption from the requirement that certain cables be separated by more than 20 feet with no intervening combustibles. This request concerns various locations inside containment. Granted

3. Intake Structure and Pull Boxes (Fire Area 31):

   III.G.2, request for exemption from the requirement that systems associated with redundant shutdown divisions be completely separated by a continuous 1-hour fire-rated barrier and the fire area containing these systems be protected by an area-wide automatic fire suppression system. In addition, request for exemption from the requirement that fire detectors be located in the area around the pull boxes. Granted

4. Air Compressor Room (Fire Area 32):

   III.G.2, request for exemption from the requirement that systems associated with redundant shutdown divisions be completely separated by a continuous

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1-hour fire-rated barrier and the fire area containing these systems be protected by an area-wide automatic fire suppression system. Granted in part.

5. Electrical Penetration Room (Fire Areas 34A/B):

III.G.2, request for exemption from the requirement to have a complete automatic fire suppression system in an area where redundant shutdown systems are protected by a 1-hour fire barrier and a fire detection system. This exemption request covers the lower electrical penetration room (Fire Area 34A). Granted

III.G.3, request for exemption from the requirement to have a fixed fire suppression system in an area for which alternate shutdown capability has been provided. This exemption request covers the upper electrical penetration room (Fire Area 34B). Granted

6. Switchgear Room (Fire Area 36):

III.G.2, request for exemption from the requirement that systems associated with redundant shutdown divisions be completely separated by a continuous 3-hour fire-rated barrier. Granted

7. Control Room (Fire Area 42):

III.G.3, request for exemption from the requirement to have a fixed fire suppression system in an area for which alternate shutdown capability has been provided. Granted

In granting the exemption requests, the staff has determined that the level of fire protection provided in the areas referred to above, given the proposed modifications, is equivalent to the level of protection required by Section III.G of Appendix R. The details of our evaluation and bases for our findings are contained in the enclosed Safety Evaluation and in the Exemption. Upon completion of the modifications discussed in our Safety Evaluation, together with the granting of the above described exemptions, it is our understanding that the remaining portions of Fort Calhoun Station will be in full compliance with the requirements of Section III.G.2 of Appendix R. It is also our understanding that all modifications will be completed 30 days after the end of the 1985 refueling outage at the latest.

A copy of the Notice of Granting of Exemption is being filed with the Office of the Federal Register for publication.

Sincerely,

/s/

Edward J. Butcher, Acting Chief
Operating Reactors Branch #3
Division of Licensing

Enclosures:
1. Exemption
2. Safety Evaluation
3. Notice of Granting of Exemption

cc w/enclosures:
See next page

ORB#3:DL	ORB#3:DL	ORB#3:DL	OELD	
PKreutzer	ETourigny;ef	EButcher	W. Shields	
6/19/85	6/20/85	6/24/85	6/24/85	
CHEB	ORB#5:DL	AD:OR:DL	D:DL	
VBenaroya	TWambach	GCLainas	HThompson	
6/24/85	6/24/85	6/27/85	7/3/85	

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
OMAHA PUBLIC POWER DISTRICT	)	Docket No. 50-285
	)	
(Fort Calhoun Station, Unit No. 1)	)	

EXEMPTION

I.

Omaha Public Power District (the licensee) is the holder of Facility Operating License No. DPR-40 that authorizes the operation of the Fort Calhoun Station, Unit No. 1 (the facility) at a steady-state power level not in excess of 1500 megawatts thermal. The facility is a pressurized water reactor (PWR) located at the licensee's site in Washington County, Nebraska. The license provides, among other things, that the facility is subject to all rules, regulations, and orders of the Commission now or hereafter in effect.

II.

10 CFR 50.48, "Fire Protection," and Appendix R to 10 CFR Part 50, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," set forth certain specific fire protection features required to satisfy the General Design Criterion related to fire protection (Criterion 3, Appendix A to 10 CFR Part 50).

Section III.G of Appendix R requires fire protection of safe shutdown capability for structures, systems, and components important to safe shutdown.

III.

Exemption requests were submitted by the licensee by letters dated August 30, 1983, December 3, 1984, January 9, 1985 and March 8, 1985.

IV.

Containment (Fire Area 30)

The licensee requested an exemption from Section III.G.2 to the extent that certain cables cannot be separated by more than 20 feet and other cables may be separated by more than 20 feet but intervening combustibles may be present.

The technical requirements of Section III.G.2 are not met in Containment because insufficient separation exists between redundant pressurizer heater cables directly beneath the pressurizer bay and because in some locations there exists a small quantity of combustibles in the intervening space between redundant shutdown systems.

At the pressurizer bay there is no significant in-situ combustibles material, fire hazard or ignition source. Because of the inaccessibility of this area, the staff has reasonable assurance that no transient combustibles will be present during non-outage periods.

In the other locations, the intervening combustibles consist of a limited quantity of IEEE-383 qualified cable. The amount of combustible material within containment varies, depending on the elevation. Because the combustibles are widely dispersed and sources of ignition are limited, the staff does not expect a fire of significant magnitude or duration to occur. Smoke and hot gases from a postulated fire would be dissipated and cooled

through the large open areas of containment. It is the staff's judgment that, under these conditions, a fire would, at most, cause damage to systems from one shutdown division, but would not be able to propagate horizontally and damage the redundant division before self extinguishing or being suppressed by the plant fire brigade.

Based on the above evaluation, the staff concludes that the existing fire protection with the proposed modifications provides an equivalent level of safety to that achieved by compliance with Section III.G. Therefore, the licensee's request for exemption in Contaiment is granted.

Intake Structure and Pull Boxes (Fire Area 31)

The licensee requested an exemption from Section III.G.2 to the extent that it requires that systems associated with redundant shutdown divisions be completely separated by a continuous 1-hour fire-rated barrier and the fire area containing these systems be protected by an area-wide automatic fire suppression system. In addition, the area around the pull boxes is not provided with fire detectors, and the licensee requested an exemption from this requirement.

The technical requirements of Section III.G are not met in these areas because of the absence of an area-wide automatic fire suppression system and because redundant shutdown systems are not separated by a 1-hour-rated fire barrier. Also, the area around the pull boxes is not provided with fire detectors.

The staff's principal concern with the level of fire protection in these areas is that, if a fire were to occur, components and cables of redundant shutdown divisions would be damaged, preventing the achievement and maintenance

of safe shutdown conditions. The fire loading within these areas is limited. Combustible materials are widely dispersed. Consequently, any potential fire would be within the capabilities of the plant fire brigade to extinguish with manual fire fighting equipment before significant levels of damage occurred. Because the intake structure and pull boxes are located away from and outside of the main plant structure, the staff has reasonable assurance that a fire would not spread to other areas containing safety related equipment. Therefore, an automatic fire suppression system is not necessary to limit fire propagation.

In the Intake Structure, if a fire were to occur at the raw water pumps, it would be detected in its initial stages by the existing fire detectors. The fire brigade would then be summoned and would effect fire extinguishment using manual hose stations or portable fire extinguishers. During the time delay associated with the arrival of the brigade, two of the pumps would be shielded from the effects of the fire by the concrete wall. In addition, smoke and heat from the fire would be vented upward and away from the pumps. Therefore, a complete 1-hour fire-rated barrier is not necessary to provide reasonable assurance that at least two pumps will remain free of fire damage.

Based on the above evaluation, the staff concludes that the existing fire protection provides an equivalent level of safety to that achieved by compliance with Section III.G. Therefore, the licensee's request for exemption for the Intake Structure and Pull Boxes is granted.

Air Compressor Room (Fire Area 32)

The licensee requested an exemption from Section III.G.2 to the extent that it requires that systems associated with redundant shutdown divisions be

completely separated by a continuous 1-hour fire-rated barrier and the fire area containing these systems be protected by an area-wide automatic fire suppression system.

The technical requirements of Section III.G.2 are not met in this area because cables and components of redundant shutdown divisions are not completely separated by a continuous 1-hour fire-rated barrier. The licensee's exemption request originally encompassed the need for an automatic fire suppression system. However, the licensee subsequently committed to install an area-wide automatic sprinkler system in the room.

The staff's concern was that a fire of significant magnitude would damage redundant shutdown cables and/or the auxiliary feedwater pumps. However, the area is equipped with a complete fire detection system designed and installed in accordance with NFPA Standard 72E. This system provides the staff with reasonable assurance that any potential fire would be detected in its incipient stages, before significant flame propagation or temperature rise occurred. The fire brigade would then be dispatched and would extinguish the fire using portable fire extinguishers or manual hose stations.

If rapid fire spread occurred prior to the arrival of the brigade, the automatic sprinkler system would actuate to suppress the fire, reduce room temperatures and protect shutdown systems. Until actuation of the suppression system, the fire barriers would provide a degree of passive protection by shielding the systems from direct flame impingement and the effects of radiant energy from a fire.

Based on the above evaluation, the staff concludes that the existing fire protection with the proposed modifications provides an equivalent level of

safety to that achieved by compliance with Section III.G. Therefore, the licensee's request for exemption for a 1-hour fire barrier in the Air Compressor Room is granted. The exemption request for an automatic fire suppression system is not needed.

Electrical Penetration Room (Fire Areas 34A/B)

The licensee requested an exemption from the technical requirements of Section III.G.2 in the Lower Penetration Room (34A) to the extent it requires a complete automatic fire suppression system in an area where redundant shutdown systems are protected by a 1-hour fire barrier and a fire detection system. The licensee requested an exemption in the Upper Penetration Room to the extent that Section III.G.3 requires a fixed fire suppression system in an area for which an alternate shutdown capability has been provided.

The technical requirements of Section III.G.2 or III.G.3 are not met in these areas because of the lack of a complete, fixed fire suppression system.

The staff was concerned that, because of the lack of a fixed fire suppression system, a fire of significant magnitude would damage shutdown systems such that safe shutdown could not be achieved and maintained. The principal fire hazard in these locations is represented by cable insulation. Because the cables are IEEE-383 qualified, the staff expects any fire involving them to initially propagate slowly but generate significant quantities of smoke. Because the areas are completely protected by a smoke detection system, the staff expects the fire to be detected and suppressed by the fire brigade before rapid heat buildup occurred. The fire would then be suppressed manually by the plant fire brigade.

If rapid fire spread occurred in the Lower Penetration Room, the 1-hour fire-rated barrier would protect shutdown related cables until the fire brigade arrived. Therefore, no loss of shutdown capability would occur.

In the Upper Penetration Room, if fire damaged redundant shutdown systems, the alternate shutdown capability, which is independent of this area, would be used to bring the plant to safe shutdown.

During any potential fire incident in these areas, the perimeter construction of these rooms would confine the effects of a fire within the walls and floor/ceilings. Therefore, the presence of a fixed fire suppression system is not necessary to limit fire spread.

Based on the above evaluation, the staff concludes that the existing fire protection with the proposed modifications provides an equivalent level of safety to that achieved by compliance with Section III.G. Therefore, the licensee's request for exemption from a fixed fire suppression system in the Upper and Lower Electrical Penetration Rooms is granted.

Switchgear Room (Fire Area 36)

The licensee requested an exemption from Section III.G to the extent that it requires that systems associated with redundant shutdown divisions be completely separated by a continuous 3-hour fire-rated barrier.

The technical requirements of Section III.G are not met in this area because redundant shutdown divisions are not separated by a complete 3-hour fire-rated barrier.

The staff had two concerns with the level of fire protection in this area. The first is that, because of the unprotected bus ducts in the perimeter walls, fire propagation could occur through the wall and affect

redundant shutdown divisions. However, the areas on both sides of these fire walls are protected by area-wide automatic fire detection and fixed fire suppression systems. The fire detection systems provide the staff with reasonable assurance of early fire awareness and response by the plant fire brigade.

Because of the limited combustibles in these areas, the staff does not expect a fire to propagate rapidly or with a high heat release rate. If rapid fire propagation occurs before the arrival of the brigade, the fire suppression system would activate to control the fire. The suppression system, with the fire-rated construction of the walls, would significantly limit damage to the area of fire origin. Because of the unprotected bus duct penetration of these walls, a small quantity of smoke and heat might spread into adjoining locations; however, the products of combustion would be so dissipated as to represent no credible threat to shutdown related systems.

The staff's second concern is that the cable fire barrier would not withstand anticipated fire conditions, with resulting damage to redundant shutdown systems.

The staff considers the barrier to be an unrated heat shield that has a limited capacity to prevent damage to protected cables. But because of the reasons discussed above, the staff does not expect a fire of significant magnitude or duration to occur. Therefore, because of the limited fire load and the automatic fire detection and suppression systems in this area, it is the staff's judgment that this heat shield will provide reasonable assurance that one division of shutdown cable will remain free of damage until the activation of the fixed fire suppression and eventual fire extinguishment.

Based on the above evaluation, the staff concludes that the existing fire protection will provide an acceptable level of safety, equivalent to that achieved by compliance with Section III.G.2. Therefore, the licensee's request for exemption from a 3-hour fire-rated barrier in the Switchgear Room is granted.

Control Room (Fire Area 42)

The licensee requested an exemption from Section III.G.3 to the extent that it requires an area-wide fixed fire suppression system in an area provided with an alternate shutdown capability.

The technical requirements of Section III.G are not met in this area because of the absence of an area-wide fixed fire suppression system.

The fire hazard in this area is low. Because of the wide dispersion of the combustible materials that may ignite, a potential fire would tend to develop slowly. Because of the smoke detection systems and the continuous manning in the control room, a fire would be detected in its initial stages and extinguished before serious damaged occurred.

If serious damage should occur before the arrival of the plant fire brigade, an alternate shutdown capability exists that is independent of the room. Therefore, safe shutdown could be achieved and maintained.

Based on the above evaluation, the staff concludes that the existing fire protection provides an acceptable level of safety equivalent to that achieved by compliance with Section III.G and, therefore, the licensee's request for exemption from a fixed fire suppression system in the control room is granted.

Summary

Based on the staff's evaluation, the following exemptions are granted:

1. Containment (Fire Area 30)
2. Intake Structure and Pull Boxes (Fire Area 31)
3. Air Compressor Room (Fire Area 32)
4. Electrical Penetration Room (Fire Areas 34A/B)
5. Switchgear Room (Fire Area 36)
6. Control Room (Fire Area 42)

V

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, the exemptions are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest and hereby grants exemptions from the requirements of Section III.G of Appendix R to 10 CFR Part 50 to the extent discussed in Section IV above.

Pursuant to 10 CFR 51.32, the Commission has determined that the issuance of the Exemption will have no significant impact on the environment (50 FR 20156).

Dated at Bethesda, Maryland, this July 3, 1985.

FOR THE NUCLEAR REGULATORY COMMISSION

Hugh L. Thompson, Jr., Director
Division of Licensing
Office of Nuclear Reactor Regulation

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO EXEMPTIONS FROM 10 CFR PART 50, APPENDIX R FACILITY OPERATING LICENSE NO. DPR-40 OMAHA PUBLIC POWER DISTRICT FORT CALHOUN STATION, UNIT NO. 1 DOCKET NO. 50-285

1.0 Introduction

By letter dated August 30, 1983, the licensee requested approval for exemptions from the technical requirements of Section III.G of Appendix R to 10 CFR Part 50 in seven areas of the plant.

These areas are as follows:

Fire Area 6 - Personnel Corridor
Fire Area 10 - Charging Pump Room
Fire Area 31 - Intake Structure - Pull Boxes
Fire Area 32 - Air Compressor Room
Fire Area 34A/B - Electrical Penetration Area
Fire Area 36 - Switchgear Room
Fire Area 42 - Control Room

By letter dated January 9, 1985, the licensee modified its exemption request for fire areas 6, 32, and 34A/B. Regarding fire area 6, the licensee implemented a repair procedure for certain cables and provided dedicated materials on site to ensure emergency repairs can be effected within 72 hours. On this basis, the licensee determined that it met the requirements of Appendix R for fire area 6 and withdrew its exemption request. Regarding fire areas 32 and 34A/B, the licensee provided additional information.

By letter dated December 3, 1984, the licensee requested an additional exemption from the technical requirements of Section III.G of Appendix R to 10 CFR Part 50 in one area of the plant. This area was fire area 30 - Containment. By letter dated March 8, 1985, the licensee provided additional information to support its exemption request for fire area 30.

Section III.G.2 of Appendix R requires that one train of cables and equipment necessary to achieve and maintain safe shutdown be maintained free of fire damage by one of the following means:

(1) 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 required of the barrier;

(2) 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 combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system will be installed in the fire areas; or

(3) Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

If these conditions are not literally met, Section III.G.3 requires an alternative shutdown capability independent of the fire area of concern. It also requires a fixed fire suppression system to be installed in the fire area of concern if it contains a large concentration of cables or other combustibles. These alternative requirements are not deemed to be equivalent; however, they provide equivalent protection for those configurations in which they are acceptable.

Because it is not possible to predict the specific conditions under which fires may occur and propagate, the design basis protective features are specified in the rule rather than the design basis fire. Plant specific features may require protection different than the measures specified in Section III.G. In such a case, the licensee must demonstrate, by means of a detailed fire hazards analysis, that existing protection in conjunction with proposed modifications will provide a level of safety equivalent to the technical requirements of Section III.G of Appendix R.

In summary, Section III.G is related to fire protection features for ensuring that systems and associated circuits used to achieve and maintain safe shutdown are free of fire damage. Fire protection configurations must either meet the specific requirements of Section III.G or an alternative fire protection configuration must be justified by a fire hazard analysis.

Our general criteria for accepting an alternative fire protection configuration are the following:

° The alternative assures that one train of equipment necessary to achieve hot shutdown from either the control room or emergency control stations is free of fire damage.

° The alternative assures that fire damage to at least one train of equiment necessary to achieve cold shutdown is limited such that it can be repaired within a reasonable time (minor repairs with components stored on-site).

° Modifications required to meet Section III.G would not enhance fire protection safety above that provided by either existing or proposed alternatives.

° Modifications required to meet Section III.G would be detrimental to overall facility safety.

2.0 Charging Pump Room (Fire Area 10)

2.1 Exemption Requested

The licensee requested exemption from Section III.G.2 to the extent that it requires that systems associated with redundant shutdown divisions be completely separated by a continuous 1-hour fire-rated barrier and the fire area containing these systems be protected by an area-wide automatic fire suppression system.

2.2 Discussion

The area is bounded by walls, floor and ceiling of 3-hour fire-rated construction, with openings protected by either 3-hour rated doors, dampers or penetration seals.

The area contains all three charging pumps and related cables.

Combustible materials in this location consist primarily of cable insulation, lube oil and hydraulic fluid which represent a fire load of approximately 13,000 BTU/sq. ft., or an ASTM E-119 fire severity of about 10 minutes.

Existing fire protection includes an area-wide automatic smoke detection system, manual hose stations and portable fire extinguishers.

2.3 Evaluation

The licensee's request for exemption was based on the charging pumps and the high pressure safety injection (HPSI) pumps being considered redundant for the post-fire reactivity control and reactor coolant makeup function. The HPSI pumps take suction from the safety injection and refueling water (SIRW) tank. The boron concentration of the SIRW tank's water inventory is sufficient to maintain cold shutdown reactivity conditions. Further, the SIRW tank has sufficient water inventory to supply the reactor coolant makeup function. The HPSI pumps operate at a lower head than the charging pumps, thus, reactor coolant system depressurization capability would be required in conjunction with the HPSI pumps. Additionally, the plant Technical Specifications consider depressurization of the reactor coolant system and use of the HPSI pumps as a third method for reactivity control. Therefore, for Appendix R considerations, the charging pumps and the HPSI pumps with depressurization capability could be considered as redundant components. The HPSI pumps are located in another fire area which is physically and electrically independent of the Charging Pump Room.

2.4 Conclusion

Based on our evaluation, we conclude that the existing configuration is in compliance with Section III.G. Therefore, the licensee's request for exemption in the Charging Pump Room is not needed.

3.0 Containment (Fire Area 30)

3.1 Exemption Requested

The licensee requested exemption from Section III.G.2 to the extent that certain cables cannot be separated by more than 20 feet and other cables may be separated by more than 20 feet but intervening combustibles are present.

3.2 Discussion

The containment structure is located in the center of the auxiliary building. It is bordered on the east by the electrical penetration area, on the west by the fuel handling area, and on the north by the mechanical and pipe penetration areas and the HVAC equipment area. All walls separating this area from the other mentioned areas are 3-hour fire-rated barriers.

The reactor, two steam generators, pressurizer, and four primary coolant pumps are enclosed in concrete cells running vertically through all three floors. There are four safety related divisions of cables in the containment. These are routed so that they meet the separation criteria of IEEE-383-1977. Much of the cabling is enclosed in conduit.

Redundant trains of safe shutdown components in this area include control rod drives, pressurizer pressure controls and instrumentation, pressurizer power operated relief valves, pressurizer heaters, charging and auxiliary pressurizer spray valves, auxiliary feedwater system valves, steam generator pressure and level transmitters, reactor coolant hot and cold leg temperature instrumentation, and neutron flux indication and all associated cables. The arrangement of shutdown systems within the containment is described in detail in the licensee's letter of March 8, 1985.

Combustible material within containment consists primarily of cable insulation and lubricating oil with a corresponding fire load of between 16,000 and 37,000 BTU/ft^2, depending on the elevation.

Existing fire protection includes a fire detection system for select locations, deluge-type fire suppression systems for the containment HVAC charcoal filters, portable fire extinguishers and manual hose stations.

By letter dated March 8, 1985, the licensee committed to implement the following modifications:

A radiant energy shield will be installed between redundant auxiliary pressurizer spray valves HCV-240 and HCV-249, and a shield between their associated junction boxes, JB-103C and JB-252C. Additionally, a radiant energy shield will be installed on the existing platform at elevation 1022'-0" between column line 14 and column line 1 where separation is less than 20 feet and no other barrier which could serve as a thermal energy shield is provided. This will protect redundant electrical penetrations C9 (HCV-240) at elevation 1015'-9" and E9 (HCV-249) at elevation 1024'-4". Additional protection such as a fire-wrap or a thermal energy shield will be provided for the 28-foot run of redundant cables so as to comply with the requirements of Section III.G of Appendix R.

Cables 3473A for LT-101Y will be rerouted in containment to ensure that redundant trains of pressurizer level indication maintain the required 20-foot separation throughout this fire area with the exception of the location of the electrical penetrations. At this location, a radiant energy shield will be installed on the existing platform at elevation 1013'-0" between column line 1 and column line 3 where separation is less than 20 feet and no other barrier which could serve as a thermal energy shield is provided. This will protect redundant electrical penetrations B5 (LT-101X and LT-101Y) at elevation 1009'-0" and C4 (LT-106) at elevation 1015'-0".

A radiant energy shield will be installed on the existing platform at elevation 1013'-0" near column line 5 beneath existing instrument rack AI-127C which holds transmitter PT-115 at approximate elevation 1015'-0". This shield will separate redundant transmitters PT-115 from PT-105 which is mounted on column line 5, (approximately 3 feet from AI-127C), at approximate elevation 1001'-0". Additionally, the radiant energy shield at elevation 1013'-0" will protect redundant electrical penetrations A4 (PT-105) at elevation 1003'-8" and D5 (PT-115) at elevation 1019'-0".

The radiant energy shield at elevation 1013'-0", will also separate redundant electrical penetrations D1 (heater groups P1 and 2) and D2 (group 1) at elevation 1019'-9" from penetrations A1 and A2 (groups P2, 3, and 4) at elevation 1003'-8". The exemption from Section III.G.2 of Appendix R is requested for the area directly beneath the pressurizer where the pressurizer heater cables converge.

This exemption also applies for those locations where 20 feet separation free of intervening combustibles has not been provided.

The licensee justifies this exemption on the basis of the limited quantities of intervening combustibles, the existing fire protection and proposed modifications.

3.3 Evaluation

The technical requirements of Section III.G.2 are not met in Containment because no separation exists between redundant pressurizer heater cables directly beneath the pressurizer bay and because in some locations there exists a small quantity of combustibles in the intervening space between redundant shutdown systems.

At the pressurizer bay there is no significant in-situ combustible material, fire hazard or ignition source. Because of the inaccessibility of this area, we have reasonable assurance that no transient combustibles will be present during non-outage periods.

In the other locations, the intervening combustibles consist of a limited quantity of IEEE-383 qualified cable. The amount of combustible material within containment varies depending on the elevation. Because the combustibles are widely dispersed and sources of ignition are limited, we do not expect a fire of significant magnitude or duration to occur. Smoke and hot gases from a postulated fire would be dissipated and cooled through the large open areas of containment. It is our judgment that, under these conditions, a fire would, at most, cause damage to systems from one shutdown division before self extinguishing or being suppressed by the plant fire brigade.

3.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection with the proposed modification provides an equivalent level of safety to that achieved by compliance with Section III.G. Therefore, the licensee's request for exemption in Containment should be granted.

4.0 Intake Structure and Pull Boxes (Fire Area 31)

4.1 Exemption Requested

The licensee requested an exemption from Section III.G.2 to the extent that it requires that systems associated with redundant shutdown divisions be completely separated by a continuous 1-hour fire-rated barrier and the fire area containing these systems be protected by an area-wide automatic fire suppression system. In addition, the areas around the pull boxes are not provided with fire detectors, and the licensee requested an exemption from this requirement.

4.2 Discussion

The intake structure is a separate building located approximately 60 feet east of the service building. The pull boxes are located outside and along the south auxiliary building wall.

Major components located in the intake structure are the three circulating water pumps, four raw water pumps, and two fire pumps.

The redundant raw water pumps, necessary for cold shutdown only, are located in a common fire area. There is 23 feet of physical separation between pumps A and B and pumps C and D as well as a concrete wall with open doorway. The power cables for all four raw water pumps are contained in individual rigid conduits. These conduits are routed through a common noncombustible heat shield, located above the circulating water pump bay. Power cables for pumps A and C are routed through a pull box and power cables for pumps B and D are routed through a different pull box. These pull boxes are separated by approximately 3-1/2 feet.

Existing fire protection for the intake structure includes a ceiling mounted smoke detection system and smoke detectors over each raw water pump; portable fire extinguishers and manual hose stations. Fire protection at the pull boxes consists of hose lines from exterior hose houses and portable fire extinguishers.

Combustible material in the Intake Structure consists primarily of lube oil and diesel fuel which represent a fire load of approximately 17,000 BTU/sq. ft., or a fire severity of about 15 minutes.

The fire load at the pull boxes would consist of a possible accumulation of transient combustibles.

The licensee justified the exemptions in these locations on the limited fuel load, the existing fire protection and the availability of a redundant shutdown capability which is independent of these fire areas.

4.3 Evaluation

The technical requirements of Section III.G are not met in these areas because of the absence of an area-wide automatic fire suppression system and because redundant shutdown systems are not separated by a 1-hour fire-rated barrier. Also, the areas around the pull boxes are not provided with fire detectors.

Our principal concern with the level of fire protection in these areas is that, if a fire were to occur, components and cables of redundant shutdown divisions would be damaged, preventing the achievement and maintenance of safe shutdown conditions.

The fire loading within this area is limited. Combustible materials are widely dispersed. Consequently, any potential fire would not propagate rapidly or with a high heat release rate. Such a fire would be within the capabilities of the plant fire brigade to extinguish with manual fire fighting equipment before significant levels of damage occurred. Because the intake structure and pull boxes are located away from and outside of the main plant structure, we have reasonable assurance that a fire would not spread to other areas containing safety related equipment. Therefore, an automatic fire suppression system is not necessary to limit fire propagation.

In the Intake Structure, if a fire were to occur at the raw water pumps, it would be detected in its initial stages by the existing fire detectors. The fire brigade would then be summoned and would effect fire extinguishment using manual hose stations or portable fire extinguishers. During the time delay associated with the arrival of the brigade, two of the pumps would be shielded from the effects of the fire by the concrete wall described above. In addition, smoke and heat from the fire would be vented upward and away from the pumps. Therefore, a complete 1-hour fire barrier is not necessary to provide reasonable assurance that at least two pumps will remain free of fire damage.

4.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection provides an equivalent level of safety to that achieved by compliance with Section III.G. Therefore, the licensee's request for exemption for the Intake Structure and Pull Boxes should be granted.

5.0 Air Compressor Room (Fire Area 32)

5.1 Exemption Requested

The licensee requested an exemption from Section III.G.2 to the extent that it requires that systems associated with redundant shutdown divisions be completely separated by a continuous 1-hour fire-rated barrier and the fire area containing these systems be protected by an area-wide automatic fire suppression system.

5.2 Discussion

The area is bounded by walls, floors and ceiling of 3-hour fire-rated construction, with openings protected by either 3-hour fire-rated doors, dampers or penetration seals.

The area contains two cable tray systems which serve various safe shutdown equipment in trains. All 480V motor control center power feeder cables are located in this area. A partial fire barrier has been provided at the point where redundant cables cross over one another in cable trays. Also located in this area are both auxiliary feedwater pumps and related cables. The pumps are positioned less than 20 feet from one another and are separated by an 8 feet by 10 feet partial height barrier constructed of a proprietary formulation of catalyzed magnesium oxychloride fireproofing to a thickness of 2 inches over metal lath. The design of the barrier is similar to that used to achieve a U.L. listed fire rating for steel columns.

The combustible material located within the compressor room consists primarily of cable insulation and lube oil which represents a fire load of approximately 40,000 BTU/sq. ft., or a fire severity of 30 minutes as determined by the ASTM E-119 time temperature curve.

Existing fire protection includes an area-wide fire detection system, a partial sprinkler system over the steam driven auxiliary feedwater pump, portable fire extinguishers and manual hose stations.

By letter dated January 9, 1985, the licensee committed to extend the existing barrier at the auxiliary feed pumps in an "L" shaped configuration. The barrier will be of a U.L. approved design, constructed of material that will have a 1-hour fire rating. In addition, an area-wide preaction sprinkler system will be installed in accordance with NFPA-13. Actuation of the system will be controlled by cross-zoned ionization detectors located in the room. Design of the system will take into account any obstructions in the area and sprinkler heads will be located to assure area-wide coverage.

Shields will be erected to protect vital electrical equipment in the room such as the motor-driven auxiliary feedwater pump. Additionally, spray nozzles will be installed along with cable trays to provide adequate coverage to protect against any fire that may develop in the cable tray system.

The licensee justified the exemption on the basis of the low fire loading, the existing fire protection and the proposed modifications.

5.3 Evaluation

The technical requirements of Section III.G.2 are not met in this area because cables and components of redundant shutdown divisions are not completely separated by a continuous 1-hour fire-rated barrier. The licensee's exemption request originally encompassed the need for an automatic fire suppression system. However, the licensee subsequently committed to install an area-wide automatic sprinkler system in the room.

Our concern was that a fire of significant magnitude would damage redundant shutdown cables and/or the auxiliary feedwater pumps. However, the area is equipped with a complete fire detection system designed and installed in accordance with NFPA Standard 72E. This system provides us with reasonable assurance that any potential fire would be detected in its incipient stages, before significant flame propagation or temperature rise occurred. The fire brigade would then be dispatched and would extinguish the fire using portable fire extinguishers or manual hose stations.

If rapid fire spread occurred prior to the arrival of the brigade, the automatic sprinkler system would actuate to suppress the fire, reduce room temperatures and protect shutdown systems. Until actuation of the suppression system, the fire barriers would provide a degree of passive protection by shielding the systems from direct flame impingement and the effects of radiant energy from a fire.

5.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection with the proposed modifications provides an equivalent level of safety to that achieved by compliance with Section III.G. Therefore, the licensee's request for exemption for a 1-hour barrier in the Air Compressor Room should be granted.

6.0 Electrical Penetration Room (Fire Areas 34A/B)

6.1 Exemption Requested

The licensee requested an exemption from the technical requirements of Section III.G.2 in the Lower Penetration Room (34A) to the extent it requires a complete automatic fire suppression system in an area where redundant shutdown systems are protected by a 1-hour fire barrier and a fire detection system. The licensee requested an exemption in the Upper Penetration Room to the extent that Section III.G.3 requires a fixed fire suppression system in an area for which an alternate shutdown capability has been provided.

6.2 Discussion

The rooms are bounded by walls, floor and ceiling of 3-hour fire-rated construction, with openings protected by either 3-hour fire-rated doors, dampers or penetration seals.

The lower electrical penetration room contains redundant power feeder cables for motor control centers MCC -3A1, 3B1, 3C1, 4A1, 4B1, and 4C1. A partial fire barrier has been erected at the point where redundant cables cross over one another.

The upper electrical penetration room also contains redundant power cables for the backup pressurizer heaters as well as MCC's for two of the backup pressurizer heater banks. The train "B" MCC is separated 16 feet horizontally and 9 feet vertically from the "A" train cable tray.

Combustible materials consist primarily of cable insulation in the lower penetration room and cable insulation with miscellaneous organic combustibles in the upper room, which represent a fire load of approximately 25,000 and 42,000 BTU/sq. ft., respectively.

Existing fire protection includes area-wide fire detection systems, portable fire extinguishers and manual hose stations.

By letter dated January 9, 1985, the licensee committed to reroute power feeder cable in the lower penetration room for MCC's -3A1, 3B1, and 3C1, in steel conduits and to completely protect the conduits in the lower penetration room by a 1-hour fire-rated barrier. The licensee also committed to provide an alternate shutdown capability for the vulnerable shutdown systems in the upper penetration room.

The licensee justifies the exemptions in these areas on the basis of the limited fire load, the existing fire protection, and the proposed modifications.

6.3 Evaluation

The technical requirements of Section III.G.2 or III.G.3 are not met in these areas because of the lack of a complete, fixed fire suppression system.

We were concerned that, because of the lack of a fixed fire suppression system, a fire of significant magnitude would damage shutdown systems such that safe shutdown could not be achieved and maintained. The principal fire hazards in these locations are represented by cable insulation. Because the cables are IEEE-383 qualified, we expect any fire involving them to initially propagate slowly but generate significant quantities of smoke. Because the areas are completely protected by a smoke detection system, we expect the fire to be detected and suppressed by the fire brigade before rapid heat buildup occurred. The fire would then be suppressed manually by the plant fire brigade.

If rapid fire spread occurred in the Lower Penetration Room, the 1-hour fire-rated barrier would protect shutdown related cables until the fire brigade arrived. Therefore, no loss of shutdown capability would occur.

In the Upper Penetration Room, if fire damaged redundant shutdown systems, the alternate shutdown capability, which is independent of this area, would be used to bring the plant to safe shutdown.

During any potential fire incident in these areas, the perimeter construction of these rooms would confine the effects of a fire within the walls and floor/ceilings. Therefore, the presence of a fixed fire suppression system is not necessary to limit fire spread.

6.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection with the proposed modifications provides an equivalent level of safety to that achieved by compliance with Section III.G. Therefore, the licensee's request for exemption for a fixed fire suppression system in the Upper and Lower Electrical Penetration Rooms should be granted.

7.0 Switchgear Room (Fire Area 36)

7.1 Exemption Requested

The licensee requested an exemption from Section III.G to the extent that it requires that systems associated with redundant shutdown divisions be completely separated by a continuous 3-hour fire-rated barrier.

7.2 Discussion

The area is bounded by walls, floor and ceiling of 3-hour fire-rated construction, with most openings protected by either 3-hour fire-rated doors, dampers and penetration seals. However, the bus duct penetration of the room perimeter walls are unprotected.

The room contains switchgear for most safe shutdown related equipment as well as all three battery chargers. It is divided into east and west sections by a 3-hour fire-rated wall, with bus duct penetrations of this wall unprotected. The common wall separates most redundant shutdown related cable and equipment.

In the west half of the switchgear room, a cable tray contains backup pressurizer heater control cables. This tray is in the same fire area as the electrical transformer which provides power to the remaining two backup heater banks. A barrier has been installed to protect one of the cable trays in this area. The nature of this barrier has previously been described in Section 5.0 of this report.

The combustible material within this plant location consists of cable insulation, which represents a fire load of approximately 51,000 BTU/sq. ft. or a fire severity of approximately 40 minutes as defined by the ASTM E-119 time temperature curve.

Existing fire protection includes area-wide fire detection systems and halon fire suppression systems for both room sections, portable fire extinguishers and manual hose stations.

The licensee justifies the exemption on the basis that the existing barrier around the backup pressurizer heater control cables and the existing perimeter construction will provide sufficient passive fire protection for one shutdown division until a fire is extinguished automatically by the fixed fire suppression system or suppressed manually by the plant fire brigade.

7.3 Evaluation

The technical requirements of Section III.G are not met in this area because redundant shutdown divisions are not separated by a complete 3-hour fire-rated barrier.

We had two concerns with the level of fire protection in this area. The first is that, because of the unprotected bus ducts in the perimeter walls, fire propagation could occur through the wall and affect redundant shutdown divisions.

However, the areas on both sides of these fire walls are protected by area-wide automatic fire detection and fixed fire suppression systems. The fire detection systems provide us with reasonable assurance of early fire awareness and response by the plant fire brigade.

Because of the limited combustibles in these areas, we do not expect a fire to propagate rapidly or with a high heat release rate. If rapid fire propagation occurs before the arrival of the brigade, the fire suppression system would activate to control the fire. The suppression system, with the fire-rated construction of the walls, would significantly limit damage to the area of fire origin. Because of the unprotected bus duct penetration of these walls, a small quantity of smoke and heat might spread into adjoining locations; however, the products of combustion would be so dissipated as to represent no credible threat to shutdown related systems.

Our second concern is that the cable fire barrier would not withstand anticipated fire conditions, with resulting damage to redundant shutdown systems.

We consider the barrier to be an unrated heat shield that has a limited capacity to prevent damage to protected cables. But because of the reasons discussed above, we do not expect a fire of significant magnitude or duration to occur. Therefore, because of the limited fire load and the automatic fire detection and suppression systems in this area, it is our judgment that this heat shield will provide reasonable assurance that one division of shutdown cable will remain free of damage until the activation of the fixed fire suppression and eventual fire extinguishment.

7.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection will provide an acceptable level of safety equivalent to that achieved by compliance with Section III.G.2. Therefore, the licensee's request for exemption for a 3-hour fire-rated barrier in the switchgear room should be granted.

8.0 Control Room (Fire Area 42)

8.1 Exemption Requested

The licensee requested an exemption from Section III.G.3 to the extent that it requires an area-wide fixed fire suppression system in an area provided with an alternate shutdown capability.

8.2 Discussion

The area is bounded by walls, floor and ceiling of 3-hour fire-rated construction with openings protected by either fire-rated doors, dampers or penetration seals.

Safe shutdown systems in the control room consist of the controls and instrumentation for all safety systems for both divisions which are located in the control boards and consoles.

Combustible materials located within the control room include paper and cable insulation which represent a fire load of about 1,000 BTU/sq. ft., or a fire severity of less than a minute as defined by the ASTM E-119 time temperature curve.

Existing fire protection includes an area-wide smoke detection system, a halon fire suppression system for the main control console, portable fire extinguishers and manual hose stations.

The licensee justifies the exemption in this area on the basis of the low fire loading, constant attendance by plant operators, the existing level of fire protection and the availablility of an alternate shutdown capability which is physically and electrically independent of the control room.

8.3 Evaluation

The technical requirements of Section III.G are not met in this area because of the absence of an area-wide fixed fire suppression system.

The fire hazard in this area is low. Because of the wide dispersion of the combustible materials that may ignite, a potential fire would tend to develop slowly. Because of the smoke detection systems and the continuous manning in the control room, a fire would be detected in its initial stages and extinguished before serious damage occurred.

If serious damage should occur before the arrival of the plant fire brigade, an alternate shutdown capability exists that is independent of the room. Therefore, safe shutdown could be achieved and maintained.

8.4 Conclusion

Based on our evaluation, we conclude that the existing fire protection provides an acceptable level of safety equivalent to that achieved by compliance with Section III.G and, therefore, the licensee's request for exemption for a fixed fire suppression system in the control room should be approved.

9.0 Summary

Based on the staff's evaluation, the following exemptions should be granted:

1. Containment (Fire Area 30)
2. Intake Structure and Pull Boxes (Fire Area 31)
3. Air Compressor Room (Fire Area 32)
4. Electrical Penetration Room (Fire Areas 34A/B)
5. Switchgear Room (Fire Area 36)
6. Control Room (Fire Area 42)

The exemption request for the Charging Pump Room is not needed.

Date: July 3, 1985

Principal Contributors: D. Kubicki, E. Tourigny

7590-01

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-285

OMAHA PUBLIC POWER DISTRICT

NOTICE OF GRANTING OF EXEMPTION FROM APPENDIX R TO 10 CFR PART 50

FIRE PROTECTION PROGRAM

The U. S. Nuclear Regulatory Commission (the Commission) has granted an Exemption from certain requirements of Appendix R to 10 CFR Part 50 to Omaha Public Power Company (the licensee). The Exemption relates to the fire protection program for the Fort Calhoun Station, Unit No. 1 (the facility) located in Washington County, Nebraska. The Exemption is effective as of July 3, 1985.

The Exemption waives certain requirements of Subsection III.G of Appendix R to 10 CFR Part 50 as follows: Certain cables in containment beneath the pressurizer need not have 20-foot separation and other cables in containment having at least 20-foot separation may have some intervening combustibles between them. An area-wide automatic fire suppression system will not be required for the intake structure and fire detectors around the pull boxes near the intake structures will not be required. Regarding the air compressor room, cables and components of redundant shutdown divisions need not be separated by a continuous 1-hour fire-rated barrier. A complete fixed fire suppression system will not be required in the electrical penetration room. In regard to the switchgear room, redundant shutdown divisions need not be separated by a complete 3-hour fire-rated barrier.

Lastly, an area-wide fixed fire suppression system will not be required for the control room. The Exemption is granted mainly on the basis that the existing fire protection, coupled with proposed modifications at Fort Calhoun, is the most practical method for meeting the intent of Appendix R and literal compliance would not significantly enhance the fire protection capability. Details are provided in the Exemption.

The requests for the Exemption comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations which are set forth in the Exemption.

Pursuant to 10 CFR 51.32, the Commission has determined that the issuance of the Exemption will have no significant impact on the environment (50 FR 20156).

For further details with respect to this action, see (1) the applications for exemptions dated August 30, 1983, December 3, 1984, and January 9 and March 8, 1985, (2) the Commission's letter dated and (3) the Exemption dated July 3, 1985. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. and at the W. Dale Clark Library, 215 South 15th Street, Omaha, Nebraska. A copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Licensing.

Dated at Bethesda, Maryland, this July 3, 1985.

FOR THE NUCLEAR REGULATORY COMMISSION

Edward J. Butcher, Acting Chief
Operating Reactors Branch No. 3
Division of Licensing