DEC 3 1 1986

Docket Nos. 50-266
and 50-301

Mr. C. W. Fay, Vice President
Nuclear Power Department
Wisconsin Electric Power Company
231 W. Michigan Street, Room 308
Milwaukee, Wisconsin 53201

Dear Mr. Fay:

SUBJECT: EXEMPTION FROM CERTAIN REQUIREMENTS OF 10 CFR PART 50, APPENDIX R, SECTION III.G - POINT BEACH NUCLEAR PLANT, UNIT NOS. 1 AND 2

The Commission has issued the enclosed Exemption to Appendix R of 10 CFR Part 50 in response to your application of April 28, 1983 as supplemented by letters dated October 26, 1983, December 11, 1985, and May 9, 1986 and October 10, 1986. The Exemption allows alternatives to the following requirements of Appendix R:

1. To the requirement of Section III.G.2.b that 20 feet of horizontal separation free of intervening combustibles be provided in the Service Water Pump Room, elevation 7 feet 0 inch.

2. To the requirement of Section III.G.2.b that an automatic fire suppression system be installed in the Residual Heat Removal Pump Fire Zone, elevation -19 feet 3 inches.

3. To the requirement of Section III.G.2.b that an automatic fire suppression system be installed throughout the Auxiliary Building Fire Area at elevations -19 feet 3 inches, -5 feet 3 inches, 8 feet, 26 feet, and 46 feet.

4. To the requirement of Section III.G.2.a that a 3-hour fire rated floor barrier be provided in the central part of the Auxiliary Building, elevation 46 feet.

8701090650 861231
PDR ADOCK 05000266
F PDR

The basis for the Exemption is contained in the enclosed Exemption and in the staff Safety Evaluation which is also enclosed. The Exemption is being forwarded to the Office of the Federal Register for publication.

Sincerely,

/s/

Thomas M. Novak, Acting Director
Division of PWR Licensing-A
Office of Nuclear Reactor Regulation

Enclosures:
1. Exemption
2. Safety Evaluation

cc's: See Next Page

Note: Removal of commitments on letter to Fay on Encl. Assess.

as noted

*SEE PREVIOUS CONCURRENCE

Office:	*LA/PAD#1	PM/PAD#1	PWR-A	OGC	PD/PAD#1	AD/PWR-A
Surname:	PShuttleworth	TColburn/tg	ERossi	WShields	GLear	TNovak
Date:	08/26/86	08/27/86	08/15/86	08/15/86	08/16/86	08/17/86

cc:
Mr. Bruce Churchill, Esq.
Shaw, Pittman, Potts and Trowbridge
1800 M Street, N.W.
Washington, DC 20036

Mr. James J. Zach, Manager
Point Beach Nuclear Plant
Wisconsin Electric Power Company
6610 Nuclear Road
Two Rivers, Wisconsin 54241

Mr. Gordon Blaha
Town Chairman
Town of Two Creeks
Route 3
Two Rivers, Wisconsin 54241

Chairman
Public Service Commission
of Wisconsin
Hills Farms State Office Building
Madison, Wisconsin 53702

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
Office of Executive Director
for Operations
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Resident Inspector's Office
U.S. Nuclear Regulatory Commission
6612 Nuclear Road
Two Rivers, Wisconsin 54241

DISTRIBUTION:
Docket Files
NRC PDR
Local PDR
PD#1 r/f
PD#1 s/f
HDenton
RVollmer
TNovak
HThompson
ORAS
PShuttleworth
TColburn
OGC-Bethesda
EJordon
BGrimes
JPartlow
TBarnhart (4)
ACRS (10)
OPA
SECY
LFMB (55292 & 55293)

7590-01

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of WISCONSIN ELECTRIC POWER COMPANY Point Beach Nuclear Plant Units 1 and 2	)))))))	Docket Nos. 50-266 and 50-301

EXEMPTION

I.

The Wisconsin Electric Power Company (WEPCO, the licensee) is the holder of Facility Operating License Nos. DPR-24 and DPR-27, which authorize operation of Point Beach Nuclear Plant, Units 1 and 2 (the facilities) at a steady-state power level not to exceed 1518 megawatts thermal. The facilities are pressurized water reactors (PWR) located in Manitowoc County, Wisconsin. These licenses provide, among other things, that the facilities are subject to all rules, regulations, and Orders of the Commission now or hereafter in effect.

II.

On November 19, 1980, the Commission published a revised Section 50.48 and a new Appendix R to 10 CFR Part 50 regarding fire protection features of nuclear power plants. The revised Section 50.48 and Appendix R became effective on February 17, 1981. Section III of Appendix R contains 15 subsections, lettered A through O, each of which specified requirements for a particular aspect of the fire protection features at a nuclear power plant.

8701090673 861231
PDR ADOCK 05000266
F PDR

One of these subsections, III.G, is the subject of the licensee's exemption request.

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:

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

b. 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 shall be installed in the fire area.

c. Enclosure of cables 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.

III.

By letter dated June 30, 1982, the licensee submitted its response to 10 CFR Part 50, Appendix R. This response, as supplemented on September 29,

and October 11, 1982, contained a fire hazards analysis. This analysis was the foundation for exemptions requested by the licensee. By draft safety evaluation dated January 14, 1983, the NRC proposed to deny all exemptions requested except for the control room and the hydrogen hazard fire protection analysis. On March 22, 1983, an appeal meeting was held with the NRC; as a result, the licensee submitted another document dated April 28, 1983. This submittal revised certain exemption requests, withdrew unnecessary exemption requests, proposed numerous plant modifications, and created two new exemption requests pertaining to the auxiliary building. The licensee also submitted a final fire protection report in October 1983, which described the alternate safe shutdown features and requested two additional new exemptions related to the auxiliary building. By letter dated July 3, 1985, the NRC approved exemptions for Fire Zones 1, 3, 2, 4, 7 and Fire Areas 5 and 8. Exemption requests for Fire Zone 10, portions of Fire Zone 2, and portions of Fire Area 8 were determined not to be required. By letter dated August 21, 1985, the NRC denied the switchgear room (Fire Area 6) exemption request. This exemption addresses the two exemptions requested by the licensee's April 28, 1983 submittal and the two exemption requests identified in the October 1983 final report.

By letters dated May 9, 1986 and October 10, 1986, the licensee provided information relevant to the "special circumstances" finding required by revised 10 CFR 50.12(a) (See 50 FR 50764). The licensee stated that existing and

proposed fire protection features at Point Beach accomplish the underlying purpose of the rule. The licensee has provided information demonstrating that suppression and detection sufficient to protect against the fire hazards of the area has been provided for the auxiliary building. Further, the licensee has demonstrated that boundary protection and existing fire barriers for the 46 foot elevation of the auxiliary building are sufficient to protect against the fire hazards associated with that area of the auxiliary building. The licensee has also demonstrated that the existing protection afforded the residual heat removal pump zone is sufficient without installation of automatic suppression. Lastly, the licensee has demonstrated that the existing fire protection features provide sufficient and equivalent protection to that which would be provided by meeting the 20 foot separation requirement. Implementing additional modifications to provide additional suppression systems, detection systems, and fire barriers would require the expenditure of additional engineering and construction resources as well as the associated capital costs and would not enhance the fire protection capability or safe shutdown capability above that provided by the licensee's proposed modifications and existing features.

The staff has reviewed the licensee's submittal and concludes that "special circumstances" exist for the licensee's requested exemptions in that application of the regulation in these particular circumstances is not necessary to achieve the underlying purposes of Appendix R to 10 CFR Part 50. See 10 CFR 50.12(a)(2)(ii).

The following is a list of active exemption requests and reflects the latest status:

1. Service Water Pump Room Fire Zone, Elevation 7 feet 0 inch. An exemption was requested from the specific requirements of Section III.G.2.b to the extent that 20 feet of separation without intervening combustibles is not provided between redundant safe shutdown equipment.
2. Residual Heat Removal Pump Fire Zone, Elevation -19 feet 3 inches. An exemption was requested from the specific requirements of Section III.G.2.b to the extent that automatic fire suppression is not installed within the common residual heat removal (RHR) pump room area.
3. Auxiliary Building Fire Area, Elevations -19 feet 3 inches; -5 feet 3 inches; 8 feet; 26 feet; and 46 feet. An exemption was requested from the specific requirements of Section III.G.2.b. to the extent that automatic fire suppression is not installed in the fire area.
4. Auxiliary Building, Elevation 46 feet. An exemption was requested from the specific requirements of Section III.G.2.a to the extent that the floor of the auxiliary building central area is not a 3-hour fire rated barrier.

Evaluation

The licensee requested an exemption from Section III.G.2.b to the extent that it requires 20 feet of separation without intervening combustibles between redundant safe shutdown equipment in the service water pump room fire zone on elevation 7 feet.

The service water pump room fire zone is a separate pump room within the circulating water pumphouse. This fire zone is constructed of reinforced concrete and metal panel wall sections. The roof and one wall are common components between the service water pump room and the circulating water pumphouse. The upper section of the common and east walls are constructed of metal grate; therefore, there is a free exchange of air between the service water pump room and the circulating water pumphouse.

The service water pump room is a rectangular shaped room with a ceiling height of 22 feet. The total room area is about 1,000 square feet. The total fire loading is 13,600 Btu per square foot. This fire load translates into a fire severity of less than 12 minutes as represented by the ASTM E-119 time-temperature curve.

The safe shutdown systems in the service water pump room include the six service water pumps for Units 1 and 2. There are no exposed power or control cables. Any one of the six service water pumps is capable of providing the required service water flow for both units to achieve stable hot shutdown. In addition, any two of the six pumps are required for both units to achieve cold shutdown.

The existing fire protection includes area wide smoke detection and an automatic wet pipe fire suppression system that has redundant connections to the fire main. Manual fire fighting capability is in the form of fire

extinguishers and two 1½-inch hose reel stations located adjacent to the entrance doors. Although 20 feet of separation without intervening combustibles is not available between redundant systems, the licensee has installed a partial height, noncombustible wall between the service water pumps such that they are divided into two sets of three.

Because the fire load in these locations is low, if a fire were to occur, we expect it would develop slowly, with initially low heat release and slow room temperature rise. Because of the presence of the early warning fire detection systems, the fire would be detected in its incipient stages. The fire brigade would then be dispatched and would extinguish the fire manually. Until the fire was extinguished, the noncombustible, partial height partition between the two sets of shutdown service water pumps and the automatic sprinkler system would provide sufficient passive and active fire protection.

Based on the above evaluation, the staff concludes that the existing fire protection combined with the proposed fire protection measures in the service water pump room provides a level of fire protection equivalent to the technical requirements for Section III.G.2.b of Appendix R.

The licensee also requested an exemption from the specific requirement of Section III.G.2.b to the extent that automatic fire suppression is not installed with the common RHR pump room area on elevation -19 feet 3 inches.

The RHR pump room is a fire zone and is below grade at elevation -19 feet 3 inches. This fire zone is constructed of floors, ceilings, and walls having 3-foot-thick reinforced concrete. There are four RHR pump rooms that open into a common fifth room. Each RHR pump is in its own room. Two RHR pumps are for Unit 1 and two RHR pumps are for Unit 2.

Each RHR pump room has about 88 square feet and there are no fire loads on the floor in this zone. There are no intervening combustibles and the fire severity, as represented by the ASTM E-119 time-temperature curve, would be less than 3 minutes or negligible.

The safe shutdown equipment in this zone consists of the four RHR pumps in two pairs. Only one of each pair is required for safe shutdown of the two units. There are no power or control cables required for hot shutdown located in this fire zone. Any cable damaged can be replaced or repaired within the time span allowed for cold shutdown.

The existing fire protection includes a fire detection system throughout the fire zone. There is no automatic fire suppression system installed within the area. Manual fire fighting capability exists within the auxiliary building in the form of fire extinguishers and hose stations.

The RHR pump fire zone does not comply with the technical requirements of Section III.G.2.b of Appendix R because an automatic fire suppression system has not been installed in the fire zone.

The staff's principal concern with the level of fire protection in the RHR pump fire zone was that because of the absence of an area wide automatic fire suppression system, a fire of significant magnitude could develop and damage redundant RHR pumps. However, the fire load in these locations is negligible. If a fire were to occur, we expect that it would develop slowly, with initially low heat release and slow room temperature rise. Because of the presence of the early warning fire detection systems,

the fire would be detected in its incipient stages. The fire brigade would then be dispatched and would extinguish the fire manually. The reinforced concrete barriers between the redundant RHR pumps would provide sufficient passive protection to provide reasonable assurance that one shutdown division of RHR pumps would remain free of fire damage.

The staff finds that the installation of an automatic fire suppression system would not significantly increase the level of fire protection in the RHR pump fire zone.

Based on the above evaluation, the staff concludes that the existing level of fire protection for the RHR pump fire zone provides a level of fire protection equivalent to the technical requirements for Section III.G.2.b of Appendix R.

The licensee also requested an exemption from the specific requirement of Section III.G.2.b to the extent that automatic fire suppression is not installed in the auxiliary building fire area on elevations -19 feet 3 inches; -5 feet 3 inches; 8 feet; 26 feet; and 46 feet.

The auxiliary building is composed of numerous zones and several small fire areas. It can be viewed as having a north, south, and west wing with a central area. The elevations range from -19 feet 3 inches to 46 feet. Penetration seals to other plant structures and construction joints are 3-hour fire rated. Doors exiting this area are 3-hour fire rated. These elevations are open to each other via an open stairwell and equipment hatch. The fire loading in this wing ranges from 8,000 to 28,000 Btu per square foot. This translates into a fire severity of less than 21 minutes as represented by the ASTM E-119 time-temperature curve.

The only safe shutdown equipment located in this area are the RHR heat exchangers, which are in separate compartments; the 480-V motor control centers (MCCs) B33 and B43; and the component cooling water (CCW) heat exchangers. There are no safe shutdown equipment or cables required for hot shutdown located in this area. Redundant trains of RHR cables are located on all elevations of this wing in configurations which are susceptible to damage from a single fire. However, the RHR system is not required for hot shutdown. A dedicated set of RHR pump cables will be provided for each unit. The component cooling water pumps are susceptible to damage from a single fire, but they are not required for hot shutdown. A spare pump and cables are being provided for the purpose of a repair.

Fire protection for the auxiliary building consists of an area wide fire detection system, fire extinguishers, and two 1½-inch hose reel stations located on the 8-foot elevation. The licensee verified that the lower elevations can be serviced by one of these hose stations. Also, several locations have wet pipe sprinkler systems.

The fire protection in the auxiliary building does not comply with the technical requirements of Appendix R, Section III.G.2.b because an automatic fire suppression system has not been installed in the area.

The staff's principal concern with the level of fire protection in the auxiliary building was that because of the absence of an area wide automatic fire suppression system, a fire of significant magnitude could develop and damage redundant shutdown-related systems, e.g., the MCCs or

CCWs. However, the fire load in these locations is low. If a fire were to occur, the staff anticipates that it would develop slowly, with initially low heat release and slow room temperature rise. Because of the presence of the early warning fire detection systems, the fire would be detected in its incipient stages. The fire brigade would then be dispatched and would extinguish the fire. In the case of the redundant RHR cables subject to damage from a single fire, spare cables have been made available for a repair, which is allowed since the RHR system is not required for hot shutdown. The same applies to the CCW cables and pumps, and a spare CCW pump also will be provided and kept available in addition to the necessary cables.

Finally, in rooms 166, 142, 151, and 156, automatic sprinkler systems already exist. Also, areas such as the RHR pump room and six charging pump rooms have been previously evaluated and approved with respect to the absence of an automatic fire suppression system. The above areas represent over one half of the total auxiliary building area. Therefore, the balance of areas represent non-critical areas containing no hot shutdown equipment and low fire loadings. The staff finds that the installation of additional automatic fire suppression systems would not significantly increase the level of fire protection in the auxiliary building.

Based on the above evaluation, the staff concludes that the existing fire protection combined with the proposed fire protection measures in the above fire zones provides a level of fire protection equivalent to the technical requirements of Section III.G.2.b of Appendix R.

The licensee also requested an exemption from the specific requirement of Section III.G.2.a to the extent that the floor of the auxiliary building central area on elevation 46 feet is not a 3-hour fire rated barrier.

The construction and layout of the auxiliary building are presented in detail in the preceding exemption request. Essentially, the auxiliary building is a single fire area composed of numerous zones and rooms. Redundant trains installed in the auxiliary building are separated by the floor/ceiling assembly on elevation 46. The floor/ceiling assembly is not a 3-hour fire rated barrier because it contains open stairways, doorways, and several hatches. With the exception of the CCW heat exchangers, there are no safe shutdown equipment or cables located on the 46-foot elevation. Fire protection exists in the form of a fire detection system, fire extinguishers, and 1½-inch hose reel stations. The fire load is low (8,000 Btu per square foot), and this translates into a fire severity of less than 6 minutes as represented by the ASTM E-119 time-temperature curve. The fire protection in the auxiliary building, elevation 46 feet, does not comply with the technical requirements of Section III.G.2.a of Appendix R because a complete 3-hour fire rated barrier has not been provided at the floor level within the central areas.

The staff's principal concern with the level of fire protection in the auxiliary building central floor area at elevation 46 feet was that because of the absence of a complete 3-hour fire rated floor, a fire of significant magnitude could develop and damage redundant safe shutdown cables at lower levels. However, there is only a low fire load on the floor area and there

are no cables or equipment required for hot shutdown in and within the central area. If a fire were to occur, then we expect it would develop slowly, with initially a low heat release and slow area temperature rise. Because of the presence of the early warning fire detection system, the fire would be detected in its incipient stages. The fire brigade would then be dispatched and would extinguish the fire. Until the fire was put out, the existing floor with its hatch covers between the central floor area on elevation 46 feet and the location of safe shutdown equipment and cables on the lower elevations would provide sufficient passive protection to provide us with reasonable assurance that one division would remain free of fire damage.

Based on the above evaluation, the staff concludes that the existing fire protection for the auxiliary building central floor area at elevation 46 feet provides a level of fire protection equivalent to the technical requirements of Section III.G.2.a of Appendix R.

IV.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), that (1) these exemptions as described in Section III are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security; and (2) special circumstances are present for the exemptions in that application of the regulation in these particular circumstances is not necessary to achieve the underlying purposes of Appendix R to 10 CFR Part 50. Therefore, the Commission grants the exemptions from the requirements of Section III.G of Appendix R to 10 CFR Part 50 to the extent discussed in Section III above.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of these exemptions will have no significant impact on the environment (December 29, 1986, 51 FR 46961).

The Safety Evaluated dated December 31 , 1986, related to this action and the above referenced submittals by the licensee are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. and at the local public document room located at the Joseph P. Mann Public Library, 1516 Sixteenth St., Two Rivers, Wisconsin.

This Exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Thomas M. Novak, Acting Director
Division of PWR Licensing-A
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland this
31st day of December, 1986

Enclosure 2

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO EXEMPTIONS FROM APPENDIX R TO CFR PART 50

WISCONSIN ELECTRIC POWER COMPANY

POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-266 AND 50-301

1.0 INTRODUCTION

By letter dated June 30, 1982, Wisconsin Electric Power Company (the licensee) submitted its response to 10 CFR Part 50 Appendix R. This response contained a fire hazards analysis, which was also the foundation for the requested exemptions. By draft safety evaluation dated January 14, 1983, the NRC denied all requested exemptions except for the control room and the hydrogen hazard fire protection analyses. On March 22, 1983, an appeal meeting was held with the NRC and, as a result, the licensee submitted another document dated April 28, 1983. This submittal revised certain exemption requests, withdrew unnecessary ones, proposed numerous plant modifications, and requested two new exemption requests pertaining to the auxiliary building. The licensee also submitted a final fire protection report in October 1983, which described the alternate safe shutdown features and requested two new exemptions relating to the auxiliary building. By letter dated July 3, 1985, the NRC approved exemption requests for Fire Zones 1, 2, 3, 7 and Fire Areas 5 and 8. Exemption requests for Fire Zone 10 and portions of Fire Zone 2 and Fire Area 8 were determined not to be required. By letter dated August 21, 1985, the NRC denied the switchgear room (Fire Area 6) exemption request. The residual unevaluated exemption requests now include the two new ones in the licensee's April 28, 1983, submittal and the two exemption requests identified in the licensee's October 1983 final report.

This evaluation is based in part on the attached Technical Evaluation Report (TER) written by the NRR contractor Franklin Research Center (FRC). This TER has been reviewed by the staff and it is in agreement with the conclusions reached in the FRC TER.

Section III.G.1 of Appendix R requires fire protection features to be provided for structures, systems, and components important to safe shutdown, capable of limiting fire damage so that:

a. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage; and

b. Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours.

8701070680 861231
PDR ADOCK 05000266
F PDR

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:

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

b. 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 shall be installed in the fire area; or

c. Enclosure of cables 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 the above conditions are not met, Section III.G.3 requires that there be an alternative shutdown capability independent of the area, room, or zone of concern. It also requires that fire detection and a fixed suppression system be installed in the area, room, or zone of concern. These alternative requirements are not deemed to be equivalent; however, they provide an acceptable level of fire protection for those configurations in which they are approved by the staff.

Because it is not possible to predict the specific conditions under which fires may occur and propagate, the design-basis protective features rather than the design-basis fire are specified in the rule. Plant-specific features may require protection different from 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 or 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. Either fire protection configurations must meet the specific requirements of Section III.G or an alternative fire protection configuration must be justified by a fire hazard analysis. Generally, the staff will accept an alternative fire protection configuration if:

- The alternative ensures 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 ensures that fire damage to at least one train of equipment necessary to achieve cold shutdown is limited so that it can be repaired within a reasonable time (minor repairs using components stored on the site).

- Fire-retardant coatings are not used as fire barriers.

- Modifications required to meet Section III.G would not enhance fire protection safety levels 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 SERVICE WATER PUMP ROOM FIRE ZONE, ELEVATION 7 FEET 0 INCH

2.1 Exemption Requested

An exemption was requested from Section III.G.2.b to the extent that it requires 20 feet of separation without intervening combustibles between redundant safe shutdown equipment.

2.2 Discussion

The service water pump room fire zone is a separate pump room within the circulating water pumphouse. This fire zone is constructed of reinforced concrete and metal panel wall sections. The roof and one wall are common components between the service water pump room and the circulating water pumphouse. The subject fire zone is on elevation 7 feet, 0 inch. The upper section of the common and east walls are constructed of metal grate; therefore, there is a free exchange of air between the service water pump room and the circulating water pumphouse. The entrance to the service water pump is via a security door in the east wall. Within the service water pump room, there is a partial height, noncombustible wall that divides the six service water pumps into two sets of three. Currently, there is an access opening in this divider wall. The licensee will permanently seal this opening shut and install a new door into the second set of service water pumps. This new door will be located within the east wall.

The Service water pump room is a rectangular shaped room with a ceiling height of 22 feet. The total room area is about 1,000 square feet. There is essentially no fire loading on the floor proper and the primary fire load present is in the form of diesel fuel for the fire pump. This fuel oil is in a day tank located 32 feet away in the circulating water pumphouse and its piping is within the concrete floor. The day tank is in a sump, which can contain the total diesel fuel volume of 250 gallons. There are no intervening combustibles located within the service water pump room that would serve a pathway between the two separated sets of three service water pumps. The total fire loading is 13,600 Btu per square foot. There are no concentrated fire loads or hazards within the service water pump room. This fire load translates into a fire severity of less than 12 minutes as represented by the ASTM E-119 time-temperature curve.

The safe shutdown systems in the service water pump room include the six service water pumps for Units 1 and 2. There are no exposed power or control cables. Also, there are no service water motor-operated valves required for safe shutdown. Any one of the six service water pumps is capable of providing the required service water flow for both units to achieve stable hot shutdown. In addition, any two of the six pumps are capable of providing the required service water flow for both units to achieve cold shutdown.

The existing fire protection includes area wide smoke detection and an automatic wet pipe fire suppression system that has redundant connections to the fire main. Manual fire fighting capability is in the form of fire extinguishers and two 1 1/2-inch hose reel stations located adjacent to the entrance doors. Although 20 feet of separation without intervening combustibles is not available between redundant systems, the licensee has installed a partial height, noncombustible wall between the service water pumps such that they are divided into two sets of three. This wall is liquid tight at the bottom.

2.3 Evaluation

The fire protection in the service water pump room fire zone does not comply with the technical requirements of Section III.G.2.b of Appendix R because 20 feet of separation without intervening combustibles has not been provided between redundant safe shutdown equipment and cables related to the service water system.

The staff's principal concern with the level of fire protection in the service water pump room was that because of the lack of a 20-foot separation free of intervening combustibles, a fire of significant magnitude could develop and damage redundant shutdown-related systems. However, the fire load in these locations is low. If a fire were to occur, we expect it would develop slowly, with initially low heat release and slow room temperature rise. Because of the presence of the early warning fire detection systems, the fire would be detected in its incipient stages. The alarms from these detectors are annunciated in the control room. The fire brigade would then be dispatched and would extinguish the fire manually. Until the fire was put out, the noncombustible, partial height partition between the two sets of shutdown service water pumps and the automatic sprinkler system would provide sufficient passive and active fire protection to provide us with reasonable assurance that two of the total of six service water pumps would remain free of fire damage.

Another major factor that reduces the consequences of fire risk in this fire zone is that the six redundant safe shutdown system service water pumps are separated into two groups of three pumps with no intervening combustibles. This physical separation is accomplished by a partial height, noncombustible radiant energy heat shield that is installed in this zone. We find that the provision of 20 feet of separation with no intervening combustibles would not significantly increase the level of fire protection in the service water pump room fire zone.

2.4 Conclusion

Based on the above evaluation, the staff concludes that the existing fire protection combined with the proposed fire protection measures in the service water pump room provides a level of fire protection equivalent to the technical requirements for Section III.G.2.b of Appendix R. Therefore, the exemption request for the aforementioned zone should be granted.

3.0 RESIDUAL HEAT REMOVAL PUMP FIRE ZONE, ELEVATION -19 FEET, 3 INCHES

3.1 Exemption Requested

An exemption was requested from the specific requirement of Section III.G.2.b to the extent that automatic fire suppression is not installed within the common residual heat removal (RHR) pump room area.

3.2 Discussion

The RHR pump room is a fire zone and is below grade at elevation -19 feet, 3 inches. This fire zone is constructed of floors, ceilings, and walls having 3-foot-thick reinforced concrete. There are four RHR pump rooms that open into a fifth room. This vestibule divides the zone into two sets of RHR pumps. Each RHR pump is in its own room. Two RHR pumps are for Unit 1 and two RHR pumps are for Unit 2. An open stairway from the upper elevation (-5 feet, 3 inches) discharges into the common room. The wall of each RHR pump room that faces the middle, common room has a 4-foot-square opening for access. This access is at the top and, hence, a short metal ladder is provided. The common wall between each RHR pump room proper is solid with no penetrations. The ceiling height in this zone is 11 feet.

Each RHR pump room has about 88 square feet and the common middle room has 573 square feet. There are no fire loads on the floor in this zone. The only fire loading is in the form of the RHR electric motors and 2 quarts of lubricating oil in each RHR pump. There are no intervening combustibles. Therefore, the total fire load is negligible. Also, there are no concentrated fire loads or fire hazards. Hence, the fire severity, as represented by the ASTM E-119 time-temperature curve, would be less than 3 minutes or negligible.

The safe shutdown equipment in this zone consists of the four RHR pumps in two pairs. Only one of each pair is required for safe shutdown of the two units. There are no power or control cables required for hot shutdown located in this fire zone. Any cable damaged can be replaced or repaired within the time span allowed for cold shutdown.

The existing fire protection includes a fire detection system throughout the fire zone. There is no automatic fire suppression system installed within the area. Manual fire fighting capability exists within the auxiliary building in the form of fire extinguishers and hose stations. The 1 1/2-inch hose station on elevation 8 feet, 0 inch can be used within the RHR fire zone. The licensee does not propose any modifications for this zone.

3.3 Evaluation

The fire protection in the RHR pump fire zone does not comply with the technical requirements of Section III.G.2.b of Appendix R because an automatic fire suppression system has not been installed throughout the fire zone.

Our principal concern with the level of fire protection in the RHR pump fire zone was that because of the absence of an area wide automatic fire suppression system, a fire of significant magnitude could develop and damage redundant RHR pumps. However, the fire load in these locations is negligible. If a fire were to occur, we expect that it would develo[illegible] with initially low heat release and slow room temperature ris[illegible]

Because of the presence of the early warning fire detection systems, the fire would be detected in its incipient stages. The alarms from these detectors are annunciated in the control room. The fire brigade would then be dispatched and would extinguish the fire manually. Until the fire was put out, the reinforced concrete barriers between the redundant RHR pumps would provide sufficient passive protection to provide reasonable assurance that one shutdown division of RHR pumps would remain free of fire damage. Another major factor that reduces the fire risk in these zones is that redundant RHR pumps are, in fact, separated by a solid, reinforced concrete wall that runs from floor to ceiling with no in-situ combustibles.

The staff finds that the installation of an automatic fire suppression system would not significantly increase the level of fire protection in the RHR pump fire zone.

3.4 Conclusion

Based on the above evaluation, the staff concludes that the existing level of fire protection for the RHR pump fire zone provides a level of fire protection equivalent to the technical requirements for Section III.G.2.b of Appendix R. Therefore, this exemption request for the aforementioned zone should be granted.

4.0 AUXILIARY BUILDING FIRE AREA, ELEVATIONS -19 FEET 3 INCHES: -5 FEET 3 INCHES; 8 FEET; 26 FEET; AND 46 FEET

4.1 Exemption Requested

An exemption was requested from the specific requirement of Section III.G.2.b to the extent that automatic fire suppression is not installed throughout the fire area.

4.2 Discussion

The auxiliary building is composed of numerous zones and several small fire areas. It can be viewed as having a north, south, and west wing with a central area. The elevations range from -19 feet 3 inches to 46 feet. The RHR pumps are located at the -19 feet 3 inch elevation; this is a separate exemption request (see Section 3.0 of this report). The other three elevation of -5 feet 3 inches, 8 feet, and 46 feet are constructed of reinforced concrete. Penetration seals to other plant structures and construction joints are 3-hour fire rated. Doors exiting this area are 3-hour rated. These elevations are open to each other via an open stairwell and equipment hatch. The only safe shutdown equipment located herein are the RHR heat exchangers, which are in separate compartments; the 480-V motor control centers (MCCs) B33 and B43; and the component cooling water (CCW) heat exchangers. There are no safe shutdown equipment or cables required for hot shutdown located herein. Also, safe shutdown cables are routed in conduit and there are no cable trays in the area. Redundant trains of RHR cables are located on all elevations of this wing in configurations which are susceptible to damage from a single fire. However, the RHR system is not required for hot shutdown. A dedicated set of RHR pump cables will be provided for each unit. The fire loading in this wing ranges from 8,000 to 28,000 Btu per square foot. This translates into a fire severity of less than 21 minutes as represented by the ASTM E-119 time-temperature curve.

Fire protection for the west wing consists of an area wide fire detection system, fire extinguishers, and two 1 1/2-inch hose reel stations located on the 8-foot elevation. The licensee verified that the lower elevations can be serviced by one of these hose stations.

The south wing at elevation 8 feet contains the auxiliary building exhaust fan rooms, heating ventilating and air conditioning (HVAC) equipment room, laundry and chemical drain tank room, reactor coolant pump (RCP) seal water filter area, Unit 1 chemical and volume control system (CVCS) charging pump rooms, and MCC 1-B32 room. The exhaust fan rooms contain no safe shutdown equipment and are a fire area because of the 2- and 3-hour fire rated enclosure components, which includes the doors. HVAC room 159 contains the exhaust fans and the Unit 1 red and blue channel instrument cables. The room enclosures are 2- and 3-hour fire rated components and the doorway openings have automatic water spray protection. The CVCS charging pump rooms each contain one pump. The enclosures are 3-hour fire rated with the doorway openings protected by an automatic water spray system. Therefore, these pump rooms are separate fire areas, as is room 156. The absence of an automatic fire suppression system in room 156 was evaluated and granted by the NRC in an exemption requested dated July 3, 1985; similarly this is also true for the safety injection pump room. The CCW pumps are susceptible to damage from a single fire, but they are not required for hot shutdown. A spare pump and cables are being provided for the purpose of a repair. The redundant divisions of charging pump cables are located here, but they too have been exempted from the Appendix R requirement for automatic fire suppression.

In general, construction throughout the south wing zones and areas is concrete. Penetrations and construction joints adjacent to other plant structures are 3-hour fire rated seals. Doors exiting this structure are 3-hour fire rated. Fire loadings do not exceed 24,000 Btu per square foot except for charcoal filters. This translates into a fire severity of 18 minutes, as represented by the ASTM E-119 time-temperature curve.

Fire protection for the south wing zones and areas within the auxiliary building consists of a fire detection system throughout, fire extinguishers, and hose reel stations. Also, several locations have wet pipe sprinkler system coverage.

The north wing has elevations 8 and 26 feet and is identical in terms of construction to the previously described portions of the south and west wings. That is, the walls, floor, and ceilings are either 3-hour fire rated or are 18-inch-thick concrete. The interior doorways to rooms have automatic water spray protection. Penetrations and doors to adjacent plant structures are 3-hour fire rated.

The north wing only contains safe shutdown equipment in the form of three charging pumps (one each in a concrete cubicle) and an MCC 2-B32 room. Also, redundant reactor coolant system (RCS) instrumentation for both units is at elevation 26 feet. Just as in the south wing for Unit 1 charging pumps, the Unit 2 charging pump rooms do not have an automatic fire suppression system. However, by letter dated July 3, 1985, this aspect has already been granted an exemption from Appendix R, Section III.G.2.b.

The fire loading in these zones and areas is less than 8,800 Btu per square foot, which translates into a fire severity of less than 7 minutes based on the ASTM E-119 time-temperature curve. The exception to this fire loading value is the charcoal filters and gas decay tanks, which have already been approved by the NRC in the August 1979 safety evaluation for not having a fire suppression system.

Fire protection for the north wing consists of an area wide fire detection system, fire extinguishers, partial coverage by wet pipe sprinkler systems, and hose stations.

4.3 Evaluation

The fire protection in the auxiliary building does not comply with the technical requirements of Appendix R, Section III.G.2.b because an automatic fire suppression system has not been installed throughout the area.

The staff's principal concern with the level of fire protection in the auxiliary building was that because of the absence of an area wide automatic fire suppression system, a fire of significant magnitude could develop and damage redundant shutdown-related systems, e.g., the MCCs or CCWs. However, the fire load in these locations is low. If a fire were to occur, we expect that it would develop slowly, with initially low heat release and slow room temperature rise. Because of the presence of the early warning fire detection systems, the fire would be detected in its incipient stages. The alarms from these detectors are annunciated in the control room. The fire brigade would then be dispatched and would extinguish the fire. Until the fire was put out, either the 20 feet of horizontal separation or concrete fire barriers between the redundant shutdown-related systems would provide sufficient passive protection to provide reasonable assurance that one shutdown division would remain free of fire damage. In the case of the redundant RHR cables subject to damage from a single fire, spare cables have been made available for a repair, which is allowed since the RHR system is not required for hot shutdown. The same applies to the CCW cables and pumps, and a spare CCW pump will also be provided and kept available in addition to the necessary cables.

Finally, in rooms 166, 142, 151, and 156, automatic sprinkler systems already exist. Also, areas such as the RHR pump room and six charging pump rooms have been previously evaluated and approved with respect to the absence of an automatic fire suppression system. The above areas represent over one half of the total auxiliary building area. Therefore, the balance of areas represent non-critical areas containing no hot shutdown equipment and low fire loadings. The staff finds that the installation of additional automatic fire suppression systems would not significantly increase the level of fire protection in the auxiliary building.

4.4 Conclusion

Based on the above evaluation, the staff concludes that the existing fire protection combined with the proposed fire protection measures in the above fire zones provides a level of fire protection equivalent to the technical requirements of Section III.G.2.b of Appendix R. Therefore, this exemption should be granted.

5.0 AUXILIARY BUILDING, ELEVATION 46 FEET

5.1 Exemption Requested

An exemption was requested from the specific requirement of Section III.G.2.a to the extent that the floor of the auxiliary building central area on elevation 46 feet is not a 3-hour fire rated barrier.

5.2 Discussion

The construction and layout of the auxiliary building are presented in detail in the preceding exemption request (Section 4.0 of this report). Essentially, the auxiliary building is a single fire area composed of numerous zones and rooms. Some of the rooms area, in actuality, small fire areas. The total auxiliary building fire area was established by completely enveloping the areas of seismic construction with 3-hour fire rated barriers except for the central area floor on the 46-foot elevation. This elevation contains open stairways, doorways, and several hatches and, therefore, it is not a 3-hour fire rated barrier.

The majority of the elevation 46 feet level floor penetrations terminate on the 26-foot elevation, and alternate safe shutdown and charging pump cable reroutings to the 8-foot elevations will be provided. Therefore, hot shutdown would not be affected. Floor penetrations in the open floor span of elevation 46 feet are provided with 3-hour fire rated seals except for several hatches. These hatches, however, are kept closed with a concrete and steel plug. Although not formally fire rated, these plugs would be highly fire resistive because of the mass and thickness of the hatch plug. Because these hatches were required for maintenance access, no combustibles, cable trays, or safe shutdown equipment are located nearby or within the intervening vertical spaces. The open stairway is located 45 feet away from Unit 2 Division "A" charging pump cable routings. The CCW system heat exchangers are on elevation 46 feet, but they are in a separate fire rated compartment.

With the exception of the CCW heat exchangers, there are no safe shutdown equipment or cables located on the 46-foot elevation.

Fire protection exists in the form of a fire detection system, fire extinguishers, and 1 1/2-inch hose reel stations. The fire load is low (8,000 Btu per square foot), and this translates into a fire severity of less than 6 minutes as represented by the ASTM E-119 time-temperature curve.

5.3 Evaluation

The fire protection in the auxiliary building, elevation 46 feet does not comply with the technical requirements of Section III.G.2.a of Appendix R because a complete 3-hour fire rated barrier has not been provided at the floor level within the central areas.

Our principal concern with the level of fire protection in the auxiliary building central floor area at elevation 46 feet was that because of the absence of a complete 3-hour fire rated floor, a fire of significant magnitude could develop and damage redundant safe shutdown cables at lower levels. However, there is only a low fire load on the floor area and there are no cables or equipment required for hot shutdown in and

within the central area. If a fire were to occur, then we expect it would develop slowly, with initially a low heat release and slow area temperature rise. Because of the presence of the early warning fire detection system, the fire would be detected in its incipient stages. The alarms from these detectors are annunciated in the control room. The fire brigade would then be dispatched and would extinguish the fire. Until the fire was put out, the existing floor with its hatch covers between the central floor area on elevation 46 feet and the location of safe shutdown equipment and cables on the lower elevations would provide sufficient passive protection to provide us with reasonable assurance that one division would remain free of fire damage. The staff finds that the provision of a 3-hour fire rated barrier for the floor level would not significantly increase the level of fire protection in this zone.

5.4 Conclusion

Based on the above evaluation, the staff concludes that the existing fire protection for the auxiliary building central floor area at elevation 46 feet provides a level of fire protection equivalent to the technical requirements of Section III.G.2.a of Appendix R. Therefore, this exemption for the aforementioned zone should be granted.

Principal Contributor: J. Stang

Dated: December 31, 1986

TECHNICAL EVALUATION REPORT

NRC DOCKET NO. 50-266, 50-301

NRC LICENSE NO. DPR-24, DPR-27

NRC CONTRACT NO. NRC-03-81-130

FRC PROJECT C5506

FRC ASSIGNMENT 36

FRC TASK 618

EVALUATION OF FIRE PROTECTION EXEMPTION REQUESTS
FROM 10CFR50.48 AND APPENDIX R TO 10CFR50

WISCONSIN ELECTRIC POWER COMPANY
POINT BEACH NUCLEAR PLANT UNITS 1 AND 2

TER-C5506-618

Prepared for

Nuclear Regulatory Commission
Washington, D.C. 20555

FRC Group Leader: N. Ahmed
NRC Lead Engineer: J. Stang

April 11, 1986

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, or any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for any third party's use, or the results of such use, of any information, apparatus, product or process disclosed in this report, or represents that its use by such third party would not infringe privately owned rights.

Prepared by: Principal Author
Date: 4/11/86

Reviewed by:
Date: 4/5/86

Approved by: Department Director
Date: 4-11-86

FRANKLIN RESEARCH CENTER
DIVISION OF ARVIN/CALSPAN
20th & RACE STREETS, PHILADELPHIA, PA 19103

8604160021 XA
18 pp.

CONTENTS

Section	Title	Page
1	INTRODUCTION	1
1.1	Purpose of Review	1
1.2	Generic Background	1
1.3	Plant-Specific Background	3
1.4	Review Criteria	4
2	EVALUATION	5
2.1	General	5
2.2	Service Water Pump Room Fire Zone, Elevation 7 Feet, 0 Inch	5
2.3	Residual Heat Removal Pump Fire Zone, Elevation -19 Feet, 3 Inches	7
2.4	Auxiliary Building Fire Area, Elevation -19 Feet, 3 Inches; -5 Feet, 3 Inches; 8 Feet; 26 Feet; and 46 Feet	9
2.5	Auxiliary Building, Elevation 46 Feet	12
3	CONCLUSIONS	14
4	REFERENCES	15

FOREWORD

This Technical Evaluation Report was prepared by Franklin Research Center (FRC) under a contract with the U.S. Nuclear Regulatory Commission (Office of Nuclear Reactor Regulation, Division of Operating Reactors) for technical assistance in support of NRC operating reactor licensing actions. The technical evaluation was conducted in accordance with criteria established by the NRC.

Mr. Gregory Harrison, a consultant to FRC, contributed to the technical preparation of this report.

1. INTRODUCTION

1.1 PURPOSE OF REVIEW

This technical evaluation report documents an independent review of exemptions or deviations from the fire protection requirements of 10CFR50.48 or Appendix R to 10CFR50 requested for Wisconsin Electric Power Company's (WEPCO) Point Beach Nuclear Plant Units 1 and 2. This evaluation was performed with the following objectives:

- To assess if each exemption request demonstrates an equivalent level of overall protection of plant safe shutdown capability following a disabling fire event
- To determine the bases for acceptance or denial of each exemption request
- To recommend the minimum level of fire protection the applicant or licensee should provide to achieve an equivalent level of fire protection in case a request is denied.

1.2 GENERIC BACKGROUND

Following a major fire at the Browns Ferry Nuclear Station in March 1975, the NRC established a Special Review Group which initiated an evaluation of the need for improving the fire protection programs at all nuclear power plants. The group found serious design inadequacies regarding fire protection at Browns Ferry, and its report, "Recommendation Related to Browns Ferry Fire" (NUREG-0050, February 1976), contained over 50 recommendations regarding improvements in fire prevention and control in existing facilities. The report also called for the development of specific guidance for implementing fire protection regulations, and for a comparison of that guidance with the fire protection program at each operating plant.

NRC developed technical guidance from the technical recommendations in the Special Group's report, and issued those guidelines as Branch Technical Position (BTP) APCSB 9.5-1 [1]. This guidance did not apply to plants operating at that time. Guidance to operating plants was provided later in Appendix A to BTP APCSB 9.5-1 [2], which, to the extent practicable, relies on BTP APCSB 9.5-1. The guidance in these documents was also published as Regulatory Guide 1.120 [3].

By early 1980, most operating plants had implemented most of the guidelines in Appendix A. However, the fire protection program has had some significant problems with implementation. To establish a definitive resolution of these problems in a manner consistent with the general guidelines in Appendix A to the BTP and to assure timely compliance by licensees, the Commission issued a

proposed fire protection rule and its Appendix R, which was described as setting out minimum fire protection requirements for the unresolved issues. The fire protection features addressed included protection of safe shutdown capability, emergency lighting, fire barriers, associated circuits, reactor coolant pump lubrication system, and alternate shutdown systems.

On February 17, 1981, the final rule 10CFR50.48 [4] and Appendix R to 10CFR50 [5] became effective, replacing the proposed rule. Only three of the 15 items in Appendix R were of such safety significance that they should apply to all plants, including those for which alternative fire protection actions had been approved previously by the staff. These items are protection of safe shutdown capability (including alternate shutdown systems), emergency lighting, and the reactor coolant pump lubrication system. Accordingly, the final rule required all reactors licensed to operate before January 1, 1979, to comply with these three items even if the NRC had previously approved alternative fire protection features in these areas. However, the final rule is more flexible than the proposed rule because Item III.G now provides three alternative fire protection features which do not require analysis to demonstrate the protection of redundant safe shutdown equipment, and reduces the acceptable distance in the physical separation alternative from 50 feet to 20 feet. In addition, the rule now provides an exemption procedure which can be initiated by a licensee's assertion that any required fire protection feature will not enhance fire protection safety in the facility or that such modifications may be detrimental to overall safety.

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 damage. Either fire protection configurations must meet the specific requirements of Section III.G or an alternative fire protection configuration must be justified by a fire hazard analysis. Generally, the staff will accept an alternative fire protection configuration if:

- The alternative ensures 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 ensures that fire damage to at least one train of equipment necessary to achieve cold shutdown is limited so that it can be repaired within a reasonable time (minor repairs using components stored on the site).
- Fire-retardant coatings are not used as fire barriers.
- Modifications required to meet Section III.G would not enhance fire protection safety levels above those provided by either existing or proposed alternatives.
- Modifications required to meet Section III.G would be detrimental to overall facility safety.

Guidance to the industry and the NRC positions on certain requirements of Appendix R is covered by various documents, one of them being the Generic Letter 83-33 [6] which has recently been slated to be superseded by yet another draft Generic Letter 85-01 [7]. "The interpretations of Appendix R" and "the responses to industry questions," two sections of Reference 7, are written to facilitate industry implementation of Appendix R and represent NRC position on all issues covered.

Following the promulgation of the final rule, licensees and applicants have requested exemptions and deviations from Appendix R to 10CFR50. The exemptions and deviations are in the form of a fire hazard analysis. The NRC is to review exemption requests and associated analysis to ensure each alternative to meeting the requirements of the rule provides an equivalent level of overall protection of plant safe shutdown capability. Franklin Research Center (FRC) was to provide technical assistance to the NRC within the context of the following scope of work [8]:

Subtask 1: Review each exemption request for information deficiencies. Provide Request for Information (RFI) to resolve such deficiencies.

Subtask 2: Review and evaluate each exemption or deviation request submitted by the licensees or the applicants and all additional information provided for conformance with acceptance criteria. Prepare final Technical Evaluation Report (TER) with recommendations, and their basis in support of granting or denying the exemption/deviation request.

1.3 PLANT-SPECIFIC BACKGROUND

By letter dated June 30, 1982, the Licensee submitted its response to 10 CFR 50 Appendix R. This response contained a fire hazards analysis, which was also the foundation for the requested exemptions. By draft SER dated January 14, 1983, the NRC denied all requested exemptions except for the control room and the hydrogen hazard fire protection analyses. On March 22, 1983, an appeal meeting was held with the NRC and, as a result, the Licensee submitted another document dated April 28, 1983. This submittal revised certain exemption requests, withdrew unnecessary ones, proposed numerous plant modifications, and created two new exemption requests pertaining to the auxiliary building. By letter dated July 3, 1985, the NRC approved exemption requests for Fire Zones 1, 2, 3, and 7 and Fire Areas 5 and 8. Exemption requests for Fire Zone 10 and portions of Fire Zone 2 and Fire Area 8 were determined not to be required. By letter dated August 21, 1985, the NRC denied the switchgear room (Fire Area 6) exemption request. The residual unevaluated exemption requests now include the two new ones in the Licensee's April 28, 1983 submittal and the two exemption requests identified in the Licensee's October 1983 final report.

The Request for Information (RFI) required in satisfaction of Subtask 1 was transmitted to the NRC on November 31, 1985 [9].

A site visit was made on November 26, 1985 to gather information requested in the RFI and to walkdown the areas where exemptions were requested.

The draft TER [10] was issued to NRC on January 21, 1986. The contents of the draft reflected the information contained in the Licensee's submittals identified above. This final TER incorporates all comments received from NRC to date on the draft TER.

1.4 REVIEW CRITERIA

The criteria used in reviewing the Licensee-submitted exemption requests are based on the following documents:

1. Fire Protection Program for Operating Nuclear Power Plants, 10CFR50.48

2. Appendix R to 10CFR50

3. Standard Review Plan, NUREG-0800, Branch Technical Position (BTP), APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants"

4. Appendix A to BTP APCSB 9.5-1

5. Generic Letter 85-01, "Fire Protection Policy," dated January 9, 1985.

2. EVALUATION

2.1 GENERAL

This section presents review and evaluation of exemptions or deviations from 10CFR50.48 or Appendix R to 10CFR50 requested by the Licensee (WEPCO) of Point Beach Nuclear Plant Units 1 and 2. Evaluation of exemption requests for each fire area/zone singly or collectively follows a format suggested by the NRC and is arranged in the following subsections:

- o Exemption requested
- o Discussion
- o Evaluation
- o Conclusion.

The fire area/fire zone numbering used in this section corresponds to that used in the Licensee's submittal.

2.2 Service Water Pump Room Fire Zone, Elevation 7 Feet, 0 Inch

2.2.1 Exemption Requested

An exemption was requested from Section III.G.2.b to the extent that it requires 20 feet of separation without intervening combustibles between redundant safe shutdown equipment.

2.2.2 Discussion

The service water pump room fire zone is a separate pump room within the circulating water pumphouse. This fire zone is constructed of reinforced concrete and metal panel wall sections. The roof and one wall are common components between the service water pump room and the circulating water pumphouse. The subject fire zone is on elevation 7 feet, 0 inch. The upper section of the common and east walls are constructed of metal grate; therefore, there is a free exchange of air between the service water pump room and the circulating water pumphouse. The entrance to the service water pump room is via a security door in the east wall. Within the service water pump room, there is a partial-height, noncombustible wall that divides the six service water pumps into two sets of three. Currently, there is an access opening in this divider wall. The Licensee has committed to seal this opening and install a new door into the second set of service water pumps. This new door will be located in the east wall.

The service water pump room is a rectangular shaped room with a ceiling height of 22 feet. The total room area is about 1,000 square feet. There is essentially no fire loading on the floor proper and the primary fire load consists of diesel fuel for the

fire pump. This fuel oil is in a day tank located 32 feet away in the circulating water pumphouse and its piping is within the concrete floor. The day tank is in a sump, which can contain the total diesel fuel volume of 250 gallons. There are no intervening combustibles located within the service water pump room that would serve a pathway between the two separated sets of three service water pumps. The total fire loading is 13,600 Btu per square foot, which translates into a fire severity of less than 12 minutes as represented by the ASTM E-119 time-temperature curve. There are no concentrated fire loads or hazards within the service water pump room.

The safe shutdown systems in the service water pump room include the six service water pumps for Units 1 and 2. There are no exposed power or control cables. Also, there are no service water motor-operated valves required for safe shutdown. Any one of the six service water pumps is capable of providing the required service water flow for both units to achieve stable hot shutdown. In addition, any two of the six pumps are required for both units to achieve cold shutdown.

The existing fire protection includes area-wide smoke detection and an automatic wet pipe fire suppression system that has redundant connections to the fire main. Manual fire fighting capability is in the form of fire extinguishers and two 1 1/2 inch hose reel stations located adjacent to the entrance doors. Although 20 feet of separation without intervening combustibles is not available between redundant systms, the Licensee has installed a partial-height, noncombustible wall between the service water pumps such that they are divided into two sets of three. This wall is liquid tight at the bottom.

2.2.3 Evaluation

The fire protection in the service water pump room fire zone does not comply with the technical requirements of Section III.G.2.b of Appendix R because 20 feet of separation without intervening combustibles has not been provided between redundant safe shutdown equipment and cables related to the service water system.

The principal concern with the level of fire protection in the service water pump room was that because of the lack of a 20-foot separation free of intervening combustibles, a fire of significant magnitude could develop and damage redundant safe shutdown systems. However, the fire load in these locations is low. If a fire were to occur, it is expected to develop slowly, with initially low heat release and slow room temperature rise. Because of the presence of the early warning fire detection systems, the fire would be detected in its incipient stages. The alarms from these detectors are annunciated in the control room. The fire brigade would then be dispatched and would extinguish the fire manually. Until the fire was put out, the noncombustible partial-height partition between the two sets of shutdown service water pumps and the

automatic sprinkler system would provide sufficient passive and active fire protection to provide reasonable assurance that two of the total of six service water pumps would remain free of fire damage.

Another major factor that reduces fire risk in this fire zone is the six redundant safe shutdown system service water pumps are separated into two groups of three pumps with no intervening combustibles. This physical separation is accomplished by a partial-height, noncombustible radiant energy heat shield that is installed in this zone. It is found that the provision of 20 feet of separation with no intervening combustibles would not significantly increase the level of fire protection in the service water pump room fire zone.

2.2.4 Conclusion

Based on the above evaluation, it is concluded that the existing fire protection combined with the committed fire protection measures in the service water pump room provide a level of fire protection equivalent to the technical requirements for Section III.G.2.b of Appendix R. Therefore, the exemption request for the aforementioned zone can be granted.

2.3 Residual Heat Removal Pump Fire Zone, Elevation -19 Feet, 3 Inches

2.3.1 Exemption Requested

An exemption was requested from the specific requirement of Section III.G.2.b to the extent that automatic fire suppression is not installed within the common residual heat removal (RHR) pump room area.

2.3.2 Discussion

The RHR pump room is a fire zone and is below grade at elevation -19 feet, 3 inches. This fire zone is constructed of floors, ceilings, and walls having 3-foot-thick reinforced concrete. There are four RHR pump rooms that open into a middle room or vestibule. This divides the zone into two sets of RHR pumps each RHR pump in its own room. Two RHR pumps are for Unit 1 and two RHR pumps are for Unit 2. An open stairway exists between the upper elevation (-5 feet, 3 inches) and the common room. The wall of each RHR pump room that faces the middle common room has a 4-foot-square opening for access. This access is at the top and, hence, a short metal ladder is provided. The common wall between each RHR pump room is solid with no penetrations. The ceiling height in this zone is 11 feet.

Each RHR pump room is about 88 square feet and the common middle room is 573 square feet in area. There are no fire loads on the floor in this zone. The only fire loading is in the form of

the RHR electric motors and 2 quarts of lubricating oil in each RHR pump. There are no intervening combustibles. Therefore, the total fire load is negligible. Also, there are no concentrated fire loads or fire hazards.

The safe shutdown equipment in this zone consists of the four RHR pumps in two pairs. Only one of each pair is required for safe shutdown of the two units. There are no power or control cables required for hot shutdown located in this fire zone. Any cable damaged can be replaced or repaired within the time span allowed for cold shutdown.

The existing fire protection includes a fire detection system throughout the fire zone. There is no automatic fire suppression system installed within the zone. Manual fire fighting capability exists within the auxiliary building in the form of fire extinguishers and hose stations. The 1 1/2-inch hose station on elevation 8 feet, 0 inch can be used for the RHR fire zone. The Licensee does not propose any modifications for this zone.

2.3.3 Evaluation

The fire protection in the RHR pump fire zone does not comply with the technical requirements of Section III.G.2.b of Appendix R because an automatic fire suppression system has not been installed throughout the fire zone.

The principal concern with the level of fire protection in the RHR pump fire zone was that, because of the absence of an area-wide automatic fire suppression system, a fire of significant magnitude could develop and damage redundant RHR pumps. However, the fire load in these locations is negligible. If a fire were to occur, it is expected that it would develop slowly, with initially low heat release and slow room temperature rise. Because of the presence of the early warning fire detection systems, the fire would be detected in its incipient stages. The alarms from these detectors are annunciated in the control room. The fire brigade would then be dispatched and would extinguish the fire manually. Until the fire was put out, the reinforced concrete barriers between the redundant RHR pumps would provide sufficient passive protection to provide reasonable assurance that one shutdown division of RHR pumps would remain free of fire damage. Another major factor that reduces the fire risk in these fire zones is that redundant RHR pumps are separated by a solid, reinforced concrete wall that runs from floor to ceiling with no in-situ combustibles.

It is found that the installation of an automatic fire suppression system would not significantly increase the level of fire protection in the RHR pump fire zone.

2.3.4 Conclusion

Based on the above evaluation, it is concluded that the existing level of fire protection for the RHR pump fire zone provides a level of fire protection equivalent to the technical requirements for Section III.G.2.b of Appendix R. Therefore, this exemption request for the aforementioned zone can be granted.

2.4 Auxiliary Building Fire Area Elevations -19 Feet, 3 Inches; -5 Feet, 3 Inches; 8 Feet; 26 Feet; and 46 Feet

2.4.1 Exemption Requested

An exemption was requested from the specific requirement of Section III.G.2.b to the extent that automatic fire suppression is not installed throughout the fire area.

2.4.2 Discussion

The auxiliary building is composed of numerous zones and several small fire areas. It can be viewed as having north, south, and west wings with a central area. The elevations range from -19 feet, 3 inches to 46 feet. In the west wing, the elevations range from -19 feet, 3 inches to 46 feet. The RHR pumps are located at the -19 feet, 3 inch elevation; this is a separate exemption request (see Section 2.3 of this report). The other three elevations of -5 feet, 3 inches; 8 feet; and 46 feet are constructed of reinforced concrete. Penetration seals to other plant structures and construction joints are 3-hour fire rated. Doors exiting this area are 3-hour fire rated. These elevations are open to each other via an open stairwell and equipment hatch. The only safe shutdown equipment located herein are the RHR heat exchangers, which are in separate compartments; the 480-V motor control centers B33 and B43; and the component cooling water heat exchangers. There are no safe shutdown equipment or cables required for hot shutdown located herein. Also, safe shutdown cables are routed in conduit and there are no cable trays in the area. Redundant trains of RHR cables are located on all elevations of this wing in configurations which are susceptible to damage from a single fire. However, the RHR system is not required for hot shutdown. The Licensee has committed to provide a dedicated set of RHR pump cables for each unit. The fire loading in this wing ranges from 8,000 to 28,000 Btu per square foot. This translates into a fire severity of less than 21 minutes as represented by the ASTM E-119 time-temperature curve.

Fire protection for the west wing consists of an area-wide fire detection system, fire extinguishers, and two 1 1/2 inch hose reel stations located on the 9-foot elevation. The Licensee verified that the lower elevations can be serviced by one of these hose stations.

The south wing at elevation 8 feet contains the auxiliary building exhaust fan room, HVAC equipment room, laundry and

chemical drain tank room, RCP seal water filter area, Unit 1 CVCS charging pump rooms, and MCC 1-B32 room. The exhaust fan rooms contain no safe shutdown equipment and are a fire area because of the 2- and 3-hour fire rated enclosure components, which includes the doors. HVAC room 159 contains the exhaust fans and the Unit 1 red and blue channel instrument cables. The room enclosures are -2 and 3-hour fire rated components and the doorway openings are protected by an automatic water spray system. Therefore, these pump rooms are actually separate fire areas, as is room 156. The absence of an automatic fire suppression system in room 156 was evaluated and granted by the NRC in an exemption request dated July 3, 1985; similarly this is also true for the safety injection pump room. The component cooling water pumps are susceptible to damage from a single fire, but they are not required for hot shutdown. A spare pump and cables are being provided for the purpose of a repair. The redundant divisions of charging pump cables are located here, but they too have been exempted from the Appendix R requirement for automatic fire suppression.

In general, construction throughout the south wing zones and areas is concrete. Penetrations and construction joints adjacent to other plant structures are 3-hour fire rated seals. Doors exiting this structure are 3-hour fire rated. Fire loadings do not exceed 24,000 Btu per square foot except for charcoal filters. This translates into a fire severity of 18 minutes, as represented by the ASTM E-119 time-temperature fire test curve.

Fire protection for the south wing zones and areas within the auxiliary building consists of a fire detection system throughout, fire extinguishers, and hose reel stations. Also, several locations have wet pipe sprinkler system coverage.

The north wing has elevations 8 and 26 feet and is identical in terms of construction to the previously described portions of the south and west wings. That is, the walls, floor, and ceilings are either 3-hour fire rated or are 18-inch-thick concrete. The interior doorways to rooms have automatic water spray protection. Penetrations and doors to adjacent plant structures are 3-hour fire rated.

The north wing only contains safe shutdown equipment in the form of three charging pumps (one each in a concrete cubicle) and a MCC 2-B32 room. Also, redundant RCS instrumentation for both units is at elevation 26 feet. Just as in the south wing for Unit 1 charging pumps, the Unit 2 charging pump rooms do not have an automatic fire suppression system. However, this aspect has already been granted an exemption from Appendix R, Section III.G.2.b.

The fire loading in these zones and areas is less than 8,800 Btu per square foot, which translates into a fire severity of less than 7 minutes based on the ASTM E-119 time-temperature curve. The exception to this fire loading value are the charcoal filters and

gas decay tanks, which have already been approved by the NRC in the August 1979 SER for not having a fire suppression system.

Fire protection for the north wing consists of an area-wide fire detection system, fire extinguishers, partial coverage by wet pipe sprinkler systems, and hose stations.

2.4.3 Evaluation

The fire protection in the auxiliary building does not comply with the technical requirements of Appendix R, Section III.G.2.b because an automatic fire suppression system has not been installed throughout the area.

The principal concern with the level of fire protection in the auxiliary building was that, because of the absence of an area-wide automatic fire suppression system, a fire of significant magnitude could develop and damage redundant shutdown systems, e.g., the MCCs or CCWs. However, the fire load in these locations is low. If a fire were to occur, it is expected that it would develop slowly, with initially low heat release and slow room temperature rise. Because of the presence of the early warning fire detection systems, the fire would be detected in its incipient stages. The alarms from these detectors are annunciated in the control room. The fire brigade would then be dispatched and would extinguish the fire. Until the fire was put out, either the 20 feet of horizontal separation or concrete fire barriers between the redundant shutdown systems would provide sufficient passive protection to provide reasonable assurance that one shutdown division would remain free of fire damage. In the case of the redundant RHR cables subject to damage from a single fire, spare cables have been committed to be made available for a repair, which is acceptable, since the RHR system is not required for hot shutdown. The same applies to the CCW cables and pumps. Also, a spare CCW pump will be provided and kept available in addition to the necessary cables.

Finally, in rooms 166, 142, 151, and 156, automatic sprinkler systems already exist. Also, areas such as the RHR pump room and six charging pump rooms have been previously evaluated and approved with respect to the absence of an automatic fire suppression system. The above areas represent over one half of the total auxiliary building area. Therefore, the balance of areas represent non-critical areas containing no hot shutdown equipment and low fire loadings. It is found that the installation of additional automatic fire suppression systems would not significantly increase the level of fire protection in the auxiliary building.

2.4.4 Conclusion

Based on the above evaluation, it is concluded that the existing fire protection combined with the Licensee committed fire protection measures in the above fire zones provide a level of fire protection equivalent to the technical requirements of Section III.G.2.b of Appendix R. Therefore, this exemption can be granted.

2.5 Auxiliary Building, Elevation 46 Feet

2.5.1 Exemption Requested

An exemption was requested from the specific requirement of Section III.G.2.a to the extent that the floor of the auxiliary building central area on elevation 46 feet is not a 3-hour rated barrier.

2.5.2 Discussion

The construction and layout of the auxiliary building are presented in detail in the preceding exemption request (Section 2.4 of this report). Essentially, the auxiliary building is a single fire area composed of numerous zones and rooms. Some of the rooms are, in actuality, small fire areas. The total auxiliary building fire area was established by completely enveloping the areas of seismic construction with 3-hour fire rated barriers except for the central area floor on the 46-foot elevation. This elevation contains open stairways, doorways, and several hatches. Therefore, the Point Beach auxiliary building does not satisfy the specific requirement of Appendix R for a fire area enclosure to be of a 3-hour fire rating.

The majority of the elevation 46 feet level floor penetrations terminate on the 26-foot elevation, and alternate safe shutdown and charging pump cable reroutings to the 8-foot elevations will be provided. Therefore, hot shutdown would not be affected. Floor penetrations in the open floor span of elevation 46 feet are provided with 3-hour fire rated seals except for several hatches. These hatches, however, are kept closed with a concrete and steel plug. Although not formally fire rated, these plugs would be highly fire resistive because of the mass and thickness of the hatch plug. Because these hatches were required for maintenance access, no combustibles, cable trays, or safe shutdown equipment are located nearby or within the intervening vertical spaces. The open stairway is located 45 feet away from Unit 2 Division "A" charging pump cable routings. The CCW system heat exchangers are on elevation 46 feet, but they are in a separate rated compartment.

With the exception of the CCW heat exchangers, there are no safe shutdown equipment or cables located on the 46-foot elevation.

Fire protection consists of a fire detection system, fire extinguishers, and 1 1/2-inch hose reel stations. The fire load is low (8000 Btu per square foot), and translates into a fire severity of less than 6 minutes as represented by the ASTM E-119 time temperature curve.

2.5.3 Evaluation

The fire protection in the auxiliary building, elevation 46 feet does not comply with the technical requirements of Section III.G.2.a of Appendix R because a complete 3-hour fire rated barrier has not been provided at the floor level within the central area.

The principal concern with the level of fire protection in the auxiliary building central floor area at elevation 46 feet was that, because of the absence of a complete 3-hour fire rated floor, a fire of significant magnitude could develop and damage redundant safe shutdown cables at lower levels. However, there is a low fire load on the floor area and there are no cables or equipment required for hot shutdown in and within the central area. If a fire were to occur, then it is expected that it would develop slowly, with initially a low heat release and slow area temperature rise. Because of the presence of the early warning fire detection system, the fire would be detected in its incipient stages. The alarms from these detectors are annunciated in the control room. The fire brigade would then be dispatched and would extinguish the fire. Until the fire was put out, the existing floor with its hatch covers (without intervening combustibles) between the central floor area on elevation 46 feet and the location of safe shutdown equipment and cables on the lower elevations would provide sufficient passive protection to assure that one division would remain free of fire damage. It is found that the provision of a 3-hour fire rated barrier for the floor level would not significantly increase the level of fire protection in this zone.

2.5.4 Conclusion

Based on the above evaluation, it is concluded that the existing fire protection for the auxiliary building central floor area at elevation 46 feet provides a level of fire protection equivalent to the technical requirements of Section III.G.2.a of Appendix R. Therefore, this exemption for the aforementioned zone can be granted.

3. CONCLUSIONS

This section is provided to consolidate the results of the evaluation contained in Section 2 concerning the exemptions of Appendix R to 10CFR50 for Point Beach Nuclear Plant Units 1 and 2. It is not meant as a substitute for the specific conclusions reached in the various subsections of Section 2 for which the reader is referred to specific subsections.

Based on the evaluation, the existing fire protection and/or proposed fire protection modifications in the aforementioned areas provide a level of fire protection equivalent to the technical requirements of Section III.G of Appendix R and, therefore, the following exemptions from the requirements of Section III.G of Appendix R are deemed reasonable and can be granted.

1. Service Water Pump Room Fire Zone, Elevation 7 feet, 0 inch, to the extent that 20 feet separation free of intervening combustibles is not provided in this zone pursuant to III.G.2.b. Section 2.2 provides additional information.

2. Residual Heat Removal Pump Fire Zone, Elevation -19 feet, 3 inches to the extent that an automatic fire suppression system is not installed within this zone pursuant to III.G.2.b. Section 2.3 provides further information.

3. Auxiliary Building Fire Area, Elevations -19 feet, 3 inches; -5 feet, 3 inches; 8 feet; 26 feet; and 46 feet to the extent that an automatic fire suppression sytem is not installed throughout the area pursuant to III.G.2.b. Section 2.4 provides further information.

4. Auxiliary Building, Elevation 46 feet to the extent that a 3-hour fire rated floor barrier is not provided in central zone of the auxiliary building pursuant to III.G.2.a. Section 2.5 provides further information.

4. REFERENCES

1. BTP APCSP 9.5-1 "Fire Protection Program," July 1981 (Standard Review Plan, NUREG-0800)

2. Appendix A to BTP APCSP 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976," August 23, 1976

3. Regulatory Guide 1.120, "Fire Protection Guidelines for Nuclear Power Plants," November 1977

4. 10CFR50, "Fire Protection Program for Operating Nuclear Power Plants," November 19, 1980

5. Appendix R to 10CFR50, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," November 19, 1980

6. Generic Letter 83-33, "NRC Position on Certain Requirements of Appendix to 10CFR50," October 19, 1983

7. Generic Letter 85-01, "Fire Protection Policy," January 9, 1985

8. Final Work Assignment No. 36, transmitted by M. Carrington (NRC) to Dr. S. Pandey (FRC) on July 17, 1985

9. Requests for Information (RFI), transmitted by N. Ahmed (FRC) to J. Stang (NRC) on November 13, 1985

10. Draft TER, transmitted by N. Ahmed (FRC) to J. Stang (NRC) on January 21, 1986

Dated April 11, 1986