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NUCLEAR ENGINEERING

July 28, 1986  
BECO 86-110

Mr. John A. Zwolinski, Director  
BWR Project Directorate #1  
Division of Licensing  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

License DPR-35  
Docket 50-293

Pilgrim Nuclear Power Station  
10 CFR 50, Appendix R Exemption Requests

- References
- (1) Exemption Requests #11, 12, 13, and 14, BECo Letter 83-281, dated 11/16/83.
  - (2) 10 CFR 50, Section 50.12, The Final Rule on Specific Exemptions, FR 50764, Vol. 50, No. 239

Dear Sir:

Via Reference 1, Boston Edison requested four exemptions for four fire zones from the requirements of Section III.G of Appendix R, to the extent that it requires physical separation and/or fire protection systems to protect redundant trains of safe shutdown related cable and equipment. As part of its review of the exemptions, the NRC staff visited Pilgrim Nuclear Power Station on April 1, 1986. No outstanding issues were identified at the end of the inspection.

Revised Section 50.12(a) (Reference 2) requires each licensee to submit information relevant to any of the six criteria listed in 50.12(a)(2) before an exemption can be granted by the NRC. Accordingly, BECo has reviewed the four exemptions against the criteria in 50.12(a)(2) and has determined that the physical configuration, as discussed under each exemption, along with the proposed modification, will provide an acceptable level of fire protection equivalent to that required by Section III.G.2. The attachments to this letter provide BECo evaluation of each of the four exemptions against the criteria in the revised 10 CFR 50.12(a).

Should you require additional information to enable your staff to process the exemption requests, please contact us.

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Very truly yours,

*J. Edward Howard*

TAV/pc  
Attachment

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ATTACHMENT  
EXEMPTION REQUEST # 11

An exemption was requested from the requirement to have redundant trains of equipment separated by a 3-hour boundary between Fire Zones 1.30A and 1.6/1.8. Fire Zone 1.30A is considered part of safety train "B" area. Fire Zones 1.6/1.8 are considered part of safety train "A" area because they are open to Fire Zone 1.9 which is part of safety train "A" area. The technical requirements of Section III.G.2 are not met between the two safety train areas due to lack of a three-hour rated fire door and non-fire rated penetration seals in the common boundary.

Tables 11.1 and 11.2 in Reference 1 provide information related to Fire Zones 1.30A and 1.6/1.8 respectively and include: (1) fire zone configuration, (2) safe shutdown equipment, (3) combustibles, (4) existing fire protection, and (5) proposed modification. As part of the exemption, BECo also provided theoretical and realistic analyses for a postulated fire involving the two fire zones.

Evaluation

The above exemption request #11 meets the requirements of 10CFR50.48(c)(6) and 10CFR50.12(a) as delineated below:

1. The proposed exemption request #11 is authorized by law as stated in 10CFR50.48(c)(6). It will not present an undue risk to the public health and safety, because the three-hour fire barrier between the redundant trains A and B which is required by Section III.G.2 would not enhance the fire protection safety of the facility. The basis for our conclusions are:
  - a) Fire Zone 1.30A is free of intervening combustibles. A fire will not propagate through this zone between the redundant Fire Zones 1.2 (train "B") and 1.6/1.8 (train "A").
  - b) Fire Zones 1.30A and 1.6/1.8 are not normal access areas. Fire loadings are administratively controlled in these areas.
  - c) The objective for the protection of safe shutdown capability is to ensure that at least one means of achieving and maintaining safe shutdown conditions will remain available during and after any postulated fire. After the proposed modifications are completed, only HPCI and RCIC systems (train "B") will be located in Fire Zone 1.30A. Train "A" safe shutdown systems, RHR, core spray, and ADS are located outside the Fire Zone 1.30A. Assured safe shutdown in the event of a postulated fire is maintained due to the unique configuration of zone 1.30A coupled with the proposed modifications and administrative controls. The combination of these items precludes the need to install 3-hour rated fire doors or penetrations.

2. As stated in item c) above, the application of Section III.G.2 requirements between the fire zones 1.30A and 1.6/1.8 is unnecessary to achieve the safe shutdown conditions in the event of a postulated fire. Therefore, BECo has determined that the special circumstances as provided in 10CFR50.12(a)(2)(ii) are present justifying the exemption, namely the application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule.

#### EXEMPTION REQUEST #12

This exemption was requested from the requirement to have redundant trains of equipment separated by a three-hour boundary between Fire Zones 1.30A and 1.1. The Fire Zone 1.30A is considered part of safety train "B" area. The Fire Zone 1.1 is considered part of safety train "A" area and contains components required for the "A" train of the RHR and core spray pumps. The technical requirements of Section III.G.2 are not met due to lack of a 3-hour rated fire door and non-fire related penetration seals in the common boundary between the two safety train areas.

Tables 11.1 and 12.1 in Reference 1 provide information related to Fire Zone 1.30A and 1.1 respectively, and include: (1) fire zone configuration, (2) safe shutdown equipment, (3) combustibles, (4) existing fire protection, and (5) proposed modification. As part of the exemption, BECo also provided theoretical and realistic analyses for a postulated fire involving the two fire zones.

#### EVALUATION

The above exemption request #12 meets the requirements of 10CFR50.48(c)(6) and 10CFR50.12(a) as delineated below:

1. The proposed exemption request #12 is authorized by law as stated in 10CFR50.48 (c)(6). Also it will not present an undue risk to the public health and safety, because the three hour fire rated door and 3-hour rated fire penetration seals in the common boundary between Fire Zones 1.30A and 1.1 are not necessary to enhance the fire protection safety of the facility. The basis for our conclusions are:
  - a) Fire Zone 1.30A is free of intervening combustibles and a fire will not propagate through this area between the redundant Fire Zones 1.1 (train "A") and 1.2 (train "B").
  - b) Fire Zones 1.30A and 1.1/1.2 are not normal access areas and fire loading is administratively controlled in these areas.
  - c) After the modifications are completed, only HPCI and RCIC systems (train "B") will be located in Fire Zone 1.30A. Fire Zone 1.1 contains components required for the "A" train of the RHR and core spray pumps. The closest redundant B train



components are located in Fire Zone 1.2, approximately 150 feet horizontally from the common boundary. The objective for the protection of safe shutdown capability is to ensure that at least one means of achieving and maintaining safe shutdown conditions will remain available during and after any postulated fire in either of the redundant fire zones (1.1 or 1.2) separated by Fire Zone 1.30A. This will be achieved in the present fire protection configuration without a 3-hour fire door or fire rated penetration seals.

2. As stated in item c) above, the application of Section III.G.2 requirements between the Fire Zones 1.30A and 1.1 is unnecessary to achieve the safe shutdown conditions in the event of a postulated fire. Therefore, BECo has determined that the special circumstances as provided in 10CFR50.12(a)(2)(ii) are present justifying the exemption, namely the application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule.

#### EXEMPTION REQUEST #13

This exemption was requested from the requirement to have fire resistant protection to structural steel members supporting fire barriers in Fire Zone 1.30A that are separating redundant trains of safe shutdown equipment in the Reactor Building. The two redundant trains of safe shutdown equipment are located in Fire Zones 1.9 and 1.10.

Table 11.1 in Reference 1 provides information related to Fire Zone 1.30A and includes: (1) fire zone configuration, (2) safe shutdown equipment, (3) combustibles, (4) existing fire protection, and (5) proposed modification. BECo also provided theoretical and realistic analyses for a postulated fire involving Fire Zone 1.30A.

#### EVALUATION

The above exemption request #13 meets the requirements of 10CFR50.48(c)(6) and 10CFR50.12(a) as delineated below:

1. The proposed exemption request #13 is authorized by law as stated in 10CFR50.48(c)(6). Also it will not present undue risk to the public health and safety, because fire protection for the exposed structural steel members in Fire Zone 1.30A is unnecessary and would not enhance the fire protection safety of the facility to achieve and maintain safe shutdown conditions. The basis for our conclusions are:
  - a) The Fire Zone 1.30A has low combustible loadings. Removal of the fire resistant wood scaffolding used for installation of the TMI modifications will further reduce the already low combustible loading in this zone. Removal is approximately 70% complete and will be completed in RFO #7. In addition, the existing physical configuration does not support the propagation of fire in this Fire Zone.

- b) The affects of elevated temperatures on structural steel members as discussed in Reference 1, are: (i) a postulated fire involving the 65,960,000 BTU's of combustibles would only raise the temperature of the exposed steel to approximately 326°F, well below the 650°F temperature where steel is assumed to fail. And (ii) the revised calculations indicate that the temperature of the steel will be less than half of the original calculated temperature since a total of approximately 8000 lbs of wood scaffolding will be removed.
  - c) Fire loading in the form of transient combustibles for Fire Zone 1.30A is administratively controlled. This fire zone is not used as access to other plant areas and is not normally occupied due to ALARA concerns.
  - d) In addition, a fire would have to be spread to both sides of the torus compartment before redundant components located in Fire Zones 1.9 and 1.10 could be affected. This scenario is highly improbable due to the large size of the torus and the very low combustibles in the area.
2. Thus, as stated above, the application of Section III.G.2(a) requiring the fire protection of exposed steel members in fire zone 1.30A is not necessary to achieve the safe shutdown conditions in the event of a postulated fire. Therefore, BECo has determined that the special circumstances as provided in 10CFR50.12(a)(2)(ii) are present justifying the exemption, namely the application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule.

#### EXEMPTION REQUEST #14

This exemption was requested from the requirement to provide fire resistance protection to structural steel members in Fire Zone 1.32. These structural members support fire barriers which separate redundant trains of safe shutdown equipment.

Table 14.1 in Reference 1 provides information related to Fire Zone 1.32 and includes: (1) fire area configuration, (2) safe shutdown equipment, (3) combustibles in the area, and (4) existing fire protection. As part of the exemption, BECo also provided theoretical and realistic analysis for a postulated fire involving Fire Zone 1.32.

#### Evaluation

The proposed Exemption Request #14 is authorized by law as stated in 10CFR50.48(c)(6) and the granting of the exemption will not present an undue risk to the public health and safety.

The proposed application of the regulation, Section III.G(2)(a), in Fire Zone 1.32 is unnecessary because of the existing fire area configuration and extremely low combustibles in the area.

The calculations performed to address the temperature rise on the exposed steel members due to the postulated fire involving the combustibles in Fire Zone 1.32 show a steel failure cannot occur. Therefore, protecting the exposed steel members would not enhance the fire protection safety of Pilgrim above the existing conditions. Accordingly, BECo has determined that the special circumstances as provided in 10CFR50.12(a)(2)(ii) are present justifying the exemption, namely the application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule.