Entergy

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December 8, 2009

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

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket 50-293
License No. DPR-35

Response To NRC RAI For Exemption To Allow Hot Shutdown Manual Actions At Pilgrim Nuclear Power Station (TAC NO. ME831)

REFERENCE: 1. NRC letter "Request for Additional Information (RAI) for Exemption to Allow Hot Shutdown Manual Actions at Pilgrim Nuclear Station" (TAC NO. ME0831), dated October 23, 2009.

LETTER NUMBER: 2.09.071

Dear Sir or Madam:

This letter provides the response to the NRC Request for Additional Information (RAI) identified in Reference 1. The NRC requested the additional information to complete their review of Entergy's Exemption Request from certain technical requirements of 10 CFR Part 50, Appendix R, Section III.G.2 for use of operator manual actions.

Pilgrim Station has reviewed the NRC RAI and our response is provided in Attachment 1.

Pending NRC approval of the exemption request, Pilgrim Station will implement the Fire Protection Program commitments listed in Attachment 3.

Should you have any questions regarding this submittal, please contact me at (508) 830-8403.

Sincerely,

Joseph Lynch
Licensing Manager

JRL/fxm

A006
NRR

Attachment 1 - Pilgrim RAI Response
Attachment 2 – FHA Fire Zone Data Sheet for FZ 2.16 and Sketches
Attachment 3 – Regulatory Commitment Listing

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Attachment 1 to Pilgrim Letter 2.09.071
Pilgrim Station Exemption RAI Response for
Hot Shutdown Manual Actions

RAI-01 Circumstances for Review

Section 2.0 of Enclosure 1 contains background information on the proposed OMAs but does not contain a justification for the application of special circumstances in accordance with 10 CFR 50.12.

Since, according to Section 2.0, it is the licensee's position that the protective measures prescribed by III.G.2 are not necessary to meet the underlying purpose of the rule, provide the following relevant details to support this position:

- *A technical justification of how the proposed arrangement achieves the underlying purpose of the rule.*
- *The specific requirements of III.G.2 that are not met for each of the requested exemptions, for example, a lack of fire barriers, spatial separation, automatic suppression, etc.*
- *A summary of the plant-specific features that compensate for this lack of III.G.2-required features for each of the requested exemptions. For example, note any enhanced defense-in-depth measures such as a lack of ignition sources and/or combustibles, more robust and/or supplemental detection and suppression systems and other physical or administrative controls.*
- *A technical explanation that justifies how the proposed methods will result in a level of protection that is commensurate with that intended by III.G.2.*

The licensee's response should demonstrate that defense-in-depth is provided such that operators are able to safely and reliably achieve and maintain hot shutdown capability from the control room. Note that it is the Nuclear Regulatory Commission (NRC) staffs position that operator manual actions alone, regardless of their feasibility and reliability, do not meet the underlying purpose of the rule without specific consideration of the overall concept of defense-in-depth that is being applied in a particular fire area.

RAI-01 Response

The justification for application of special circumstances in accordance with 50.12 is as follows:

1. **The requested exemption is authorized by law, does not present an undue risk to the public health and safety, and is consistent with the common defense and security**

   10 CFR 50.12(a)(1) authorizes the Nuclear Regulatory Commission to grant this exemption. Granting of this exemption would not present an undue risk to the

public health and safety as it provides an equivalent level of protection to the public as that provided by literal compliance to Appendix R, Section III.G.3. The common defense and security is not affected by this exemption request.

In the unlikely event of fire in the fire zones addressed in the exemption, safe shutdown equipment can be controlled from either the control room or emergency control stations consistent with Appendix R, Section III.G.1 requirements. The manual actions have been reviewed and were determined to be feasible and reliable. Fire protection defense-in-depth was also reviewed and ensured to be adequate.

Details relative to justifying the adequacy of fire protection features in applicable fire zones are provided as appropriate in our responses to the subsequent RAI questions.

2. Special circumstances are present as defined in 10 CFR 50.12(a)(2)

10 CFR 50.12(a)(2) states, in part:

"The commission will not consider granting an exemption unless special circumstances are present. Special circumstances are present whenever...(ii) Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule;..."

Underlying purpose of the rule

<u>Achieve and Maintain Hot Shutdown During a Fire Event</u>

The underlying purpose of 10 CFR 50 Appendix R, Section III.G.1 is to provide reasonable assurance that at least one train of systems necessary to achieve and maintain safe shutdown conditions from either the control room or emergency control stations(s) is free from fire damage. Pilgrim station satisfies the underlying purpose of 10 CFR 50 Appendix Section III.G.1 for all plant fire areas.

However, as stated in our initial 1982 response to Appendix R (Reference 1), Pilgrim Station did not meet the separation requirements of Appendix R Section III.G.2 for seventeen (17) of the sixty-nine fire zones evaluated. Consistent with compliance strategies described in the initial Appendix R submittal for the seventeen (17) fire zones, Pilgrim Station implemented modifications and developed safe shutdown procedures which relied on manual actions to ensure that safe shutdown could be achieved in each of the seventeen fire zones. Section 7.2 of this submittal identified that "There are seventeen (17) fire areas (sic) in Pilgrim Nuclear Power Station that will not meet the requirements of Section III.G.2 and alternate shutdown or exemption from III.G.2 are provided."

Fire Zones 2.1, 2.2, 2.10, and 2.16, were identified as zones that did not meet Appendix R, Section III.G.2. A review of these specific zones revealed alternate shutdown modifications were not provided and no corresponding exemption request for either III.G.2 or III.G.3 was submitted or approved.

NRC review of Pilgrim Station's Appendix R submittal is documented in their 1983 Safety Evaluation Report (Reference 2). This Safety Evaluation Report (SER) evaluated the proposal for providing modifications and manual actions. This SER approved the conceptual design for alternate shutdown and identified that exemptions from the requirements of Appendix R would be the subject of future correspondence. The SER stated that "safe shutdown systems will be monitored and controlled from the control room or the remote shutdown panels and local control stations."

Based on the SER approval, Pilgrim Station implemented plant modifications and developed safe shutdown procedures to ensure safe shutdown capability for all plant fire areas. The safe shutdown procedures identify the procedure (operator actions) relied on to align safe shutdown components whose cables could be affected by fire in specific plant fire zones. This safe shutdown capability was installed and implemented in 1987 and meets the underlying intent of the 10 CFR 50, Appendix R Section III.G.1 regulation.

Special Circumstance

A review of NRC Regulatory Guide (RG) 1.189, Revision 2, dated October 2009 (Reference 3), identifies that special circumstances exist when an approved SER is issued and no corresponding exemption has been approved. The RG identifies that Pre-1979 licensees need an exemption, even if a staff decision in an SER approves an aspect of the Fire Protection Program (FPP) that does not comply with regulatory requirements. The RG specifically identifies (on page 13 under SERs) that pre-1979 licensees that have SERs, but not a corresponding exemption from the regulatory requirements, e.g., an SER that approves operator manual actions with meeting the protective requirements of Appendix R, Section III.G.2, must request an exemption under 10 CFR 50.12 by (1) highlighting the special circumstances of 10 CFR 50.12(a)(2), (2) citing the SER as the safety basis, and (3) confirming that the safety basis established in the SER remains valid.

In accordance with the instruction provided in RG 1.189, the special circumstance is that the provision of 10 CFR 50.12(a)(2) apply; the previously approved SER provides the safety basis; and the safety basis established in the SER remains valid.

RAI-02 Ensuring that One of the Redundant Trains is Free of Fire Damage

Section 2.0 of Enclosure 1 states that Fire Zones 2.1, 2.2, 2.10, and 2.16 are not in compliance with Appendix R, Section III.G.2 and that hot shutdown OMAs located

outside the fire area of origin would be required to align redundant train systems in these fire zones to achieve safe shutdown. Section 3.1 also states that the procedure makes provision for a worst-case fire affecting all of the fire zones that are grouped into Fire Area 1.10.

The method described in the request appears to demonstrate safe shutdown capability independent of the fire area of origin, yet the request is for an exemption from the requirements of III.G.2. III.G.2 specifically states that measures must be taken to ensure that one of the redundant trains remains free of fire damage and provides three options for accomplishing this. Furthermore, the use of OMAs, in lieu of the three options provided in III.G.2, is not explicitly included as a means of compliance with III.G.2. Section III.G.3 of Appendix R addresses alternative or dedicated shutdown capability independent of the fire area of origin and establishes a series of requirements to achieve and maintain safe shutdown capability.

Confirm whether an exemption from III.G.2 requirements is the intended purpose of the request and provide a technical justification for demonstrating compliance with III.G.2 since safe shutdown capability is provided independent of the fire area of origin.

If compliance with Section III.G.3 is being proposed instead of III.G.2, confirm whether redundant safe shutdown equipment located within a particular fire area is assumed lost or damaged during a fire event and demonstrate how the use of the proposed OMAs will provide the safe shutdown capability.

RAI-02 Response

The exemptions for Fire Zones 2.1, 2.2, 2.10 and 2.16 were requested based on information provided in RIS 2006-10 (Reference 4). Section 2.3 of this document provides guidance which indicates that an exemption from III.G.2 should be requested when a previously approved manual action is credited in lieu of one of the means specified in III.G.2.

However, RIA questions and new guidance provided in RG 1.189 necessitated a reevaluation of compliance strategies in each of the above referenced fire zones. Based on this reassessment, compliance with Appendix R Section III.G.1 can be demonstrated in Fire Zones 2.1, 2.2, and 2.10 without reliance on Alternate Shutdown capability or OMAs to support "required for hot shutdown" equipment. As such one train of systems necessary to achieve and maintain hot shutdown conditions from the Control Room is free from fire damage and no exemption from Appendix R is required. The exemptions for Fire Zones 2.1, 2.2 and 2.10 are being withdrawn.

As for Fire Zone 2.16, an exemption from III.G.3 is requested for lack of fire suppression in an alternate shutdown area. Pilgrim proposes to install fire detectors in this fire zone (see Attachment 3). All safe shutdown equipment associated with cables routed through this zone are assumed to be lost or damaged during the fire event. The OMA to start the "B" train RBCCW Pumps (P202D and E) from the C150 Alternate Shutdown Panel

located in the Reactor Auxiliary Bay will provide alternate shutdown capability for redundant train equipment affected by fire. All other redundant train safe shutdown systems will be operated from the Control Room free from fire damage.

In addition, this III.G.3 exemption request invokes requirements to ensure that Appendix R Section III.L performance goals are satisfied. This review was performed. Since Fire Zone 2.16 credits the use of low pressure systems for the success path, temporary core uncovery may occur and an additional Appendix R exemption is required. Although, RG 1.189 Section 5.1 identifies that temporary core uncovery in BWRs may be acceptable when depressurizing and using low-pressure systems for post-fire safe shutdown, a separate exemption request will be submitted under separate cover letter to address all plant fire areas and fire zones which rely on the low pressure systems that credit alternate shutdown for III.G.3 compliance (see Attachment 3). This lack of compliance concern for III.G.3 fire zones is attributed to misinterpreting the 1983 NRC SER which allowed the use of operator manual actions for fire areas not meeting Appendix R, Section III.G.2 criteria.

RAI-03 Other Evaluations

Fire areas may have other exemptions or engineering evaluations that affect fire protection systems or safe shutdown capabilities.

Provide a discussion of any other exemptions or evaluations that impact this request in any way and a justification for why such impact should be considered acceptable.

RAI-03 Response

The Fire Hazards Analysis (FHA) Fire Zone Data Sheet for Fire Zone 2.16 is provided in Attachment 2. This data sheet identifies the fire protection system and safe shutdown capabilities provided in the zone. This fire zone data sheet also identifies applicable exemptions and engineering evaluations.

Fixed fire suppression and detection is not installed in the zone. However, reliance on fire suppression and detection capability is not credited to ensure safe shutdown equipment and cables in redundant train safe shutdown systems can be operated for safe shutdown. In Zone 2.16, redundant safe shutdown equipment and cables are not located in the zone, with the exception of the RBCCW System, and can be operated from the Control Room. An OMA to start the "B" train RBCCW Pumps (P202D and E) from the C150 Alternate Shutdown Panel located in the Reactor Auxiliary Bay ensures that RBCCW pumps are free from fire damage.

Fire detectors will be installed in the area where redundant train safe shutdown cables are routed (see Attachment 3).

RAI-04 Standards and Listings for Systems and Barriers

Section 3.0 of Enclosure 1 notes that several areas are equipped with various fire detection and suppression systems. However, the request does not state whether the systems have been designed and installed in accordance with recognized design standards.

Where fire protection features such as detection and suppression systems and fire rated assemblies are installed, describe the technical basis for such installations including the applicable codes, standards and listings. In addition, provide a technical justification for any deviations from codes, standards and listings by independent testing laboratories in the fire areas that could impact this evaluation. Lastly, provide a technical justification for any non-rated fire protection assemblies.

Section 3.1 of Enclosure 1 states that the Fire Zone 2.1 -"B" switchgear room is separated from other plant areas by rated fire barriers. State what the fire rating is for the barriers as well as any penetrations and whether they are designed and installed in accordance with a particular standard or listing.

Section 3.2 of Enclosure 1 states that the Fire Zone 2.2 -"A" switchgear room is equipped with ionization smoke detectors installed throughout the area. State whether the detectors have been installed and maintained in accordance with a particular design standard or basis, e.g. National Fire Protection Association 72: National Fire Alarm Code, 1985 Edition.

RAI-04 Response

Fire Zone 2.16 is a stairway in the Control Building and includes a horizontal walkway in the Turbine Building. This zone contains neither suppression nor detection. Pilgrim proposes to install automatic smoke detectors in the vicinity of the cable trays in the Stairway at the 23' elevation with alarms sounding the Control Room.

While Fire Zone 2.16 is currently shown as part of Fire Area 1.9, it has sufficient fire barriers to be a Fire Area unto itself. A fire originating in this zone will not spread to any other zones. Several of the fire barriers are 2 hour rather than 3 hours, but, consistent with Generic Letter 86-10 and exemption request #23 (Reference 5), these have been evaluated and found to be sufficient to withstand the hazards to which it could possibly be exposed in a fire. Pilgrim's Fire Protection Engineering Evaluation process has been approved by the NRC in the SER dated 10/13/1988 (Reference 6). Fire doors, dampers and penetrations are rated for three hours or, in the case of a few penetrations, been evaluated and found to be adequate using the process mentioned above. There is no barrier between Fire Zone 2.16 of Fire Area 1.9 and Fire Zone 1.27 of Fire Area 1.21 in the long corridor at elevation 51'. Both of these areas are associated with "A" train Safe Shutdown Equipment. This condition is acceptable as documented in FPEE 14. There are no fire dampers in the ventilation openings in the ceiling of the corridor above

elevation 51' between Fire Zone 2.16 and Fire Zone 2.12 of Fire Area 1.10. FPEE #22 justifies the lack of dampers in this barrier because physical configuration of these areas.

The required OMA is not affected because a fire in the cable trays in the starwell adjacent to the Vital MG Set Room (Fie Zone 3.5) on the east side of the plant cannot adversely impact the ability of operators to access areas on the west side of the plant more than 200' away. None of the conclusions reached in the evaluations can adversely affect this Exemption Request.

RAI-05 Time and Sequence Assumptions

Section 3.3 of Enclosure 1 contains a discussion of the amount of time required to perform the OMA to start the "A" train diesel power and states that the action must be performed within 24 minutes of the onset of fire and that a completion time of 15 minutes is expected. Section 3.4 states that decay heat removal must be initiated within two (2) hours but does not include any information about how long it takes operators to complete the manual action of manually starting the reactor building closed cooling water pumps.

For each of the operator manual actions contained in this request, include a discussion of the required time versus the observed and/or calculated completion time. The licensee's response should also include a description of the assumptions and procedures that are accounted for each time.

The request also lacks a detailed description of the series of events that may occur prior to initiating the OMA procedures. For example, Section 3.3 of the request does not describe whether the procedures are initiated immediately upon activation of the smoke detection system in Fire Zone 2.10, or upon confirmation of a fire in that zone, or upon some other form of indication. For this example, if the operators were to take 10 minutes to diagnose or confirm the fire and begin the procedure and the redundant components were damaged upon the onset of the fire, this would result in a total of 25 minutes (10 minutes for confirmation and 15 minutes for the OMA) to complete the procedure, which would exceed the 24-minute time limit noted in Section 3.3. Therefore, sufficient time would not be available to assure safe shutdown.

Describe the circumstances and assumptions needed to enter the OMA procedure. For example, describe the amount of time, and the technical basis, that has been assumed for detection and assessment of a postulated fire as well as the expected plant response to a postulated fire. Additionally, either provide an analysis and/or technical justification that demonstrates that the ability to detect a fire is sufficient to provide notification of a postulated event before damage to the redundant trains occurs or provide an analysis and/or technical justification to evaluate scenarios where the redundant components are damaged, before a fire has been detected.

RAI-05 Response

The time sequence assumptions applicable to the OMA required in Fire Zone 2.16 are as follows:

OMA	Symptoms	Analyzed Time limit after RX Scram	Time Necessary to complete the OMA	OMA Assumptions
Locally Start RBCCW Pump B from C150 in RB Aux Bay (Zone 1.22)	Fire Reported in Stairway #8 (Zone 2.16) and Spurious operation of equipment due to control cables noted in Control Room	2 hours after scram (or T=0). Based on time needed to initiate RHR Torus Cooling for decay heat removal	15 minutes based on operator estimate to get briefed, access radios and perform action. An Engineered Isolation switch is located on ASD Panel C-150.	No delay expected. Control Room instrumentation available to verify RBCCW pump op. Expect Ops to start RBCCW pump for DHR immediately after vessel level is stable, > 1 hour, fire out and no OMA impact.

RAI-06 Ignition sources and Combustible Fuel Load

Section 3.1 of Enclosure 1 states that the combustible loading in Fire Zone 2.1, is cable Insulation, but the room is classified as a switchgear room. Section 3.4 of Enclosure 1 states that Fire Zone 2.16 contains fire brigade lockers, self contained breathing apparatus (SCBA) and cable insulation but that the analysis considers the fire load to be low.

Provide critical details and/or assumptions regarding the fire hazards for each fire area included in the request. This information may include, but is not limited to:

- *The number, type and location of potential ignition sources.*
- *The number and types of equipment that may exhibit high energy arcing faults, and the relationship between this equipment and any secondary combustibles.*
- *The quantity of cables and other secondary combustibles and their relationship to potential ignition sources.*
- *The cable type, e.g., thermoplastic or thermoset. If thermoplastic cables are used, provide a discussion of self-ignited cable fires.*

• *Ratings for cables, e.g., Institute of Electrical and Electronics Engineers (IEEE)-383, etc. If not rated, justify why fire spread would be assumed to be slow.*
• *Controls on hot work and transient combustibles in the area, and the proximity of secondary combustibles that could be impacted by a transient fire, and*
• *Dimensions of the rooms including ceiling heights.*

RAI-06 Response

There are no ignition sources in the Fire Zone 2.16 stairway. There is no equipment in this zone other than the cabling. All power cable is protected with appropriate circuit breakers or fuses. The stairway is not used for transient material other than that which is being transported through and constantly attended. The probability of fire originating in this zone is very low.

High energy arcing in Fire Zone 2.16 is not likely given the lack of equipment subject to arcing in the zone.

The fire loading in Fire Zone 2.16 represents one fourth of the amount allowed for a Low classification pursuant to NFPA guidelines. While the Fire Hazards Analysis assumes a relatively large amount of transient combustibles, there are literally none in the area of concern. There are two very separate areas where the combustible material exists in almost equal quantities. The first is the cable trays by the Vital MG Set Room at elevation 23'. The second is the fire brigade equipment located in metal lockers each fully enclosed on 5 sides and with one side having ventilation openings. These are located on elevation 51' greater than 50' from the trays and free of any intervening combustibles. Considering the small quantity of cables, and the fact that they are either coated with a fire retardant material (Flamemastic) or equipped with metal covers, the spread of fire between the cable trays and the brigade material is not considered to be a credible event. The brigade material is at the top elevation and fire spread to the stairway several floors below is also not considered to be a credible event.

The cable insulation is thermoset plastic not thermoplastic.

Pilgrim construction began prior to the requirement to meet IEEE 383. In our case, we coated any cable, not routed in covered trays, that did not meet IEEE 383 with a fire retardant material (Flamemastic) and all subsequent cable installed in the Process Buildings was required to meet that standard.

Pilgrim has formal Fire Protection Engineering procedure (EN-DC-161, Reference 7) that is required to be followed when bringing combustibles into the Process Buildings. Formal Fire Protection Engineering procedure (EN-DC-127, reference 8) is required to be followed when conducting hot work on site.

Fire Zone 2.16 is the stairway and has a floor area less than 1,000 sq. ft. and is located between elevations -1' to 51'.

RAI-07 Fire Zone Proximity and Access

Section 3.4 of Enclosure 1 states that Fire Zone 2.16 is a subset of Fire Area 1.9 and that this zone is comprised of Stairway #8 and that the fire area contains multiple fire zones in the Reactor Building, Turbine Building, Radwaste Building and Diesel Generator Rooms.

For each fire area included in the request, provide a technical justification that demonstrates that a fire in the fire area of fire origin would not impact the performance of the OMA. The licensee's response should address effects of fire such as heat, smoke, ventilation and any other fire effects that could have an impact on the OMAs.

RAI-07 Response

A fire originating in Fire Zone 2.16 will not impact performance of the proposed OMAs because fire is not expected to spread from the fire zone of origin. In addition, all of the proposed OMAs and the access routes from and to the plant locations where the OMAs are required, do no require entry into the fire zone of origin. The OMA time sequence review provided in the response to RAI-05 identifies that a delay in OMA action for over one hour is acceptable. Since the equivalent fire severity value established for this zone is less than 20 minutes and it is expected that fire brigade actions can extinguish all fires in these zones within one hour, the adverse effects of heat, smoke and ventilation will not affect the performance of the OMA.

Defense-in-depth fire protection program controls will be relied on to minimize potential for fire spread. The walls, floor and ceiling barriers that enclose these plant areas were evaluated and determined adequate to prevent significant fire spread. Controlled fire barriers are maintained to preclude fire spread to adjacent areas containing redundant safe shutdown equipment and cabling. The construction details and associated fire ratings of the wall, floor, and ceiling barriers are defined in the Station Fire Hazards Analysis (FHA). A Fire Zone Data Sheet for Fire Zone 2.16 is included as Attachment 2. Administrative controls prevent the introduction of combustible controls and to control ignitions sources. In addition, a fully trained five man fire brigade is continuously available to respond to and fight plant fires. The fire brigade leader is a member of the operations staff, and as a result has been trained on both fire fighting strategies and safe shutdown procedures. Requirements to vent smoke and heat associated with fire will be assessed by the fire brigade leader and appropriate vent locations will be determined based on the extent of fire conditions and consideration of operations staff needs.

RAI-08 Fire Scenarios

Sections 3.1 to 3.4.1 of Enclosure 1 state that OMAs are needed to restore power to various busses and Motor Control Center or manually start a diesel generator but do not state what fire scenarios have been considered for the postulated events.

For each OMA included in this request, describe the in situ and transient fire hazards (ignition potential and combustibles) in the fire area that have the potential to affect the redundant trains. Provide a description of the proximity of the redundant train equipment to in situ hazards and the spatial relationship between the redundant trains in the fire area such that if they are damaged, manual actions would be necessary. Note, that this question is distinct from the RAI addressing Ignition Sources and Combustible Loading, which is generally focused on the combustibles in an area, whereas, this RAI addresses the specific relationship between ignition sources and combustibles and the redundant trains.

For example:

For Fire Zone 2.1, no information is provided to describe the spatial relationship between Bus B2 and the transfer control circuitry and other combustibles in the area. Also, missing is a discussion of the relationship between Bus B1 and B2 and whether these two buses are located such that a single fire event could damage both buses.

For Fire Zone 2.16, no information is provided to describe what elevation the redundant train cables are located at or if they are located within the stairwell or hallway. It is also not clear where the cables are located relative to floor, walls and other trains or whether any spatial separation exists between the two trains.

For Fire Zone 2.10, no information is provided to describe what equipment, in addition to the diesel control circuit, would be damaged to challenge safe shutdown. Provide the distance between the diesel control circuit and any other nearby equipment that would require the use of the A train diesel. Additionally, provide a discussion of the differing room elevations and any intervening ignition sources and combustibles.

RAI-08 Response

Fire Zone 2.16 contains "B" cable trays at approximately elevation 30' in the East side of the stairway. The trays run North/South. The "A" cables are routed in steel conduits in the West side of the stairwell and they are routed vertically up the stairwell from the basement elevation to approximately elevation 47' into the "A" Battery Room. The two trains of cable are approximately 10' apart at the closest point with no intervening combustibles. The stairwell vents freely up to the operating floor elevation above 51'. There are no real floors in the stairwell, rather there is open grating in this section of the stairwell.

RAI-09 Staffing

Section 3.1 of Enclosure 1 states that there are 5 operators separate from the fire brigade to perform safe shutdown tasks and that one operator can perform the OMA. For each of

the OMAs included in the request, provide a justification that at least one of the operators will be available to perform the requested OMAs.

RAI-09 Response

Pilgrim Station maintains a minimum shift staff of at least five (5) operators separate from the station fire brigade to perform safe shutdown actions. These five station operators will provide the response necessary to recognize and address fire scenarios requiring plant shutdown. For a Fire Zone 2.16 fire event, safe shutdown will be accomplished from the Control Room with the exception of the required OMA. When decay heat removal actions are needed approximately one hour after plant scram, one of the five operators will be ordered to perform the fire safe shutdown procedure action to start the "B" Train RBCCW pumps, if needed. At this time in the event, fire is expected to be extinguished, the plant is expected to be stable and operator availability to perform the OMA is not limited.

RAI-10 Communication

Provide a technical justification that all the communication methods, walkie talkies, cell phones and gaitronics are available in all locations where manual actions are necessary. If cell phones are to be relied upon, provide justification that all cell phone types and providers have sufficient coverage, and that the cell phones are maintained with appropriate quality assurance for fire protection. In addition, if the walkie talkies are not part of the plant radio system maintenance and testing program provide justification that the walkie-talkies will provide adequate coverage and are properly maintained.

RAI-10 Response

The communication method to be used by Pilgrim Station operators to address safe shutdown requirements for fire area scenarios will be through use of the dedicated safe and alternate shutdown radio system that was installed by Plant Design Change (PDC) 87-29. This radio system provided for an Ultra High Frequency (UHF) radio repeater system which consists of radios, radio storage locations, radio charger strips, and a radio repeater station system that is located outside the plant power block which is not subject to fire damage from any internal plant fire that can affect equipment necessary for safe shutdown. The radios are surveiled on a monthly basis to ensure operability via plant Procedure 2.1.26. A complete set of six (6) radios are provided in both the upper and lower switchgear rooms to ensure that at least one complete set of radios is available for use given a fire in either switchgear room. The radio repeater and base station are surveilled and maintained via plant procedure EP-AD-302. This radio and radio repeater system provides adequate coverage for all plant area fires.

RAI-11 Feedwater Heater Bay Exposure Hazards

Section 3.3 of Enclosure 1, states that there are no fire barriers between Fire Zone 2.10 and the adjacent zones that are located to the west and south. Provide a description of

the fire hazards in those zones and a technical justification for why the fire hazards in those zones would not be more limiting than those in Fire Zone 2.10.

RAI-11 Response

The fire zones that are to the west and south of Fire Zone 2.10 are not separated by fire barriers. Reassessment of Appendix R compliance in Fire Zone 2.10 and the adjacent zones to the west and south revealed that Appendix R III.G.1 compliance is demonstrated without reliance on the previously identified OMA to locally start the "A" Diesel.

REFERENCES

1. Pilgrim Letter to NRC, A. Morisi to D. Vassallo, "Boston Edison Response to Appendix R", June 25, 1982

2. NRC Letter and SER, D. Vassallo to W. Harrington, "Safety Evaluation for Appendix R to 10 CFR Part 50, Items III.G.3 and III.L" dated November 2, 1983.

3. Regulatory Guide 1.189 Rev 2, "Fire Protection For Nuclear Power Plants," October 2009

4. NRC Regulatory Issue Summary RIS 2006-10, "Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions," June 30, 2006.

5. Pilgrim Letter 2.88.120, License Amendment Request, License Condition 3.F of FOL DPR-35, dated August 6, 1988

6. NRC SER, "Reduced Fire Barrier Requirements For Selected Fire Selected Fire Areas," dated October 13, 1988.

7. Entergy Procedure EN-DC-161, "Control of Combustibles", Revision 3

8. Entergy Procedure EN-DC-127, "Control of Hot Work and Ignition Sources", Revision 7

Attachment 2 to Letter 2.09.071

Fire Hazards Analysis
Fire Zone Data Sheet For
Fire Zone 2.16 and Sketches
(7 pages)

FIRE HAZARDS ANALYSIS
FIRE ZONE DATA SHEET

PILGRIM NUCLEAR POWER STATION

A. **FIRE AREA** 1.9 **FIRE ZONE** 2.16 **REF. DWG(S)** A316,317, 318 & 319

LOCATION (BLDG/ELEV) Radwaste/Control Building/El. (-)1' -0" up to 61' -7"

DESCRIPTION Stairwell No. 8 and East End of Time Tunnel Corridor

B. **COMBUSTIBLE LOADING INFORMATION: (SEE APPENDIX A FOR DETAILS)**

Total Heat Value 19,918,448 **BTU** **Floor Area** 773 **SQ.FT.**

Average Heat Loading 25,768 **BTU/SQ.FT.**

Equivalent Fire Severity 19.3 **MINUTES**

Combustible Loading Severity Low

Anticipated Fire Development Slow

C. **FIRE BARRIERS**

BARRIER NO.	ADJACENT ZONE/AREA	ORIENTATION	DESCRIPTION	BARRIER RATING	REFERENCE
201.505	3.10B/1.10	South Wall	Reinforced Concrete (R.C) El. (-)1' -0" up to 23', 2' -0" Thick	3 Hr	C-201
191.56	3.7/1.10	East Wall	Concrete Block 8" Thick, El.(-)1' -0" up to 23'	3 Hr	C-191
191.55	3.7/1.10	North Wall	Concrete Block 8" Thick, El.(-)1' -0" up to 23'	3 Hr	C-191
201.514	2.10/1.10	West Wall	R.C.3'-0" Thick, El.(-)1' -0" up to 23'	3 Hr	C-201
194.503	2.4/1.10	South Wall	R.C. 2'-0" Thick, El. 23' up to 37'	3 Hr	C-209
194.504A	2.1/1.10	South Wall	R.C. 2'-0" Thick, El. 23' up to 37'	3 Hr	C-194 & C-209

FIRE HAZARDS ANALYSIS
FIRE ZONE DATA SHEET

PILGRIM NUCLEAR POWER STATION

C. **FIRE BARRIERS**

BARRIER NO.	ADJACENT ZONE/AREA	ORIENTATION	DESCRIPTION	BARRIER RATING	REFERENCE
194.508	3.2/3.2	East Wall	R.C. 1' -6" Thick, El. 23' up to 37'	3 Hr	C-194
194.507	3.2/3.2	North Wall	R.C. 1' -6" Thick, El. 23' up to 37'	3 Hr	C-194
194.20	3.5/1.9	North Wall	Concrete Block, 8" Thick, El. 23' up to 37'	2 Hr	C-194 & EE #45
194.502B	2.10/1.10	West Wall	R.C. 3' -6" Thick, El. 23' up to 37'	3 Hr	C-194
195.504	2.3/1.9	South Wall	R.C. 24" Thick, El. 37' up to 51'	3 Hr	C-195 & C-210
194.505B	2.2/1.9	South Wall	R.C. 2'-0" Thick, El. 37' up to 51'	3 Hr	C-195 & C-210
195.23B	3.1/3.1	East Wall	Concrete Block, 8" Thick, El. 37' up to 51'	2 Hr	C-195 & EE #5
195.20	3.1/3.1	North Wall	Concrete Block, 8" Thick, El. 37' up to 51'	2 Hr	C-195 & EE #5
195.22A	3.1/3.1	North Wall	Concrete Block, 8" Thick, El. 37' up to 51'	2 Hr	C-195 & EE #5
195.21	3.1/3.1	North Wall	Concrete Block, 8" Thick, El. 37' up to 51'	2 Hr	C-195 & EE #5
195.503D	2.10/1.10	West Wall	R.C. 40" Thick, El. 37' up to 51'	3 Hr	C-195
Stair treads	3.1/3.1	North Wall	Steel Stair Treads and Risers	N/A	C-195 & EE #10
212.1B	2.12/1.10	South Wall	R.C. 40" Thick, El. 37' up to 51'	3 Hr	C-212
212.3	2.12/1.10	South Wall	Concrete Block, 18" Thick, El. 51' (Time Tunnel)	3 Hr	C-212
212.4	2.12/1.10	South Wall	Concrete Block, 18" Thick, El. 51' (Time Tunnel)	3 Hr	C-212

FIRE HAZARDS ANALYSIS
FIRE ZONE DATA SHEET

PILGRIM NUCLEAR POWER STATION

C. FIRE BARRIERS

BARRIER NO.	ADJACENT ZONE/AREA	ORIENTATION	DESCRIPTION	BARRIER RATING	REFERENCE
212.5	2.12/1.10	South Wall	Concrete Block, 18" Thick, El. 51' (Time Tunnel)	3 Hr	C-212
212.6A & B	2.12/1.10	East Wall	Concrete Block, 18" Thick, El. 51' (Time Tunnel)	3 Hr	C-212
65.18	1.23B/1.10	North Wall	Concrete Block, 1' 6" Thick, El. 51' (Time Tunnel)	3 Hr	C-212 & C-65
65.19B	1.23B/1.10	North Wall	Concrete Block, 8" Thick, El. 51' (Time Tunnel)	3 Hr	C-65
212.8	1.27/1.21	West Wall	Open, El. 51' (Time Tunnel)	None	A42 EE #14
212.602	2.9/1.10 2.10/1.10	Floor	R.C. 42" Thick, El. 51' (Time Tunnel)	3 Hr	C-212 & EE #83
212.602	3.1/3.1	Floor	R.C. 12" Thick,	3 Hr	C-212
95.602	2.12/1.10	Ceiling El. 61' -7"	R.C. 6" Thick, (Min) El. 51' (Time Tunnel)	3 Hr	C-212
196.602	2.12/1.10	Ceiling El. 51'	R.C. 2' -0" Thick	3 Hr	C-196 & C-225

D. FIRE DOORS IN FIRE BARRIERS

REF. DWG(S) A43 & A44

DOOR NO.	BARRIER NO.	FIRE RATING (HRS)	COMMENTS
24	201.505	3 Hr	
93	194.508	3 Hr	
94	194.20	3 Hr	
95	194.504A	3 Hr	
144	195.505B	3 Hr	
145/159	195.23B	3 Hr	
147	195.20	3 Hr	

FIRE HAZARDS ANALYSIS
FIRE ZONE DATA SHEET

PILGRIM NUCLEAR POWER STATION

E. FIRE DAMPERS IN FIRE BARRIERS REF. DWG(S) M474, SHTS 1&2

DAMPER NO.	BARRIER NO.	ELEVATION	TYPE (GRILL OPENING OR DUCT)	FIRE RATING (HRS)
ACR-1	201.505	B.O.D. 17' -0"	Duct	3 Hr
VMG-1	194.20	B.O.D. 31' -9"	Grill	3 Hr
VMG-2	194.20	B.O.D. 27' -0"	Grill	3 Hr
SWGB-1	194.504A	B.O.D. 33' -3"	Duct	3 Hr

F. FIRE PROTECTION

DETECTION: None

AUTOMATIC SUPPRESSION: None

HOSE REEL (NEAREST)
INSIDE ZONE: RC-59-37
OUTSIDE ZONE: RC-57-01, RC-58-23, RC-60-51 & TA-86-51 in adjacent Fire Zones 3.7, 2.1, 2.12 and 1.23B, respectively.

G: ZONE FEATURES LIMITING FIRE SPREAD TO ADJACENT ZONES:
This zone consists of a stairway and a portion of a corridor. There is no continuity of combustibles and the combustible loading is light. Fire propagation out of this zone other than smoke and heat venting to Fire Zones 2.11 and 2.12 is not a credible event.

H. VENTILATION:
The Time Tunnel corridor is the upper most part of this zone and any smoke and heat would vent freely to the Turbine Building in the area by the Reactor Feed Pumps.

FIRE HAZARDS ANALYSIS
FIRE ZONE DATA SHEET

PILGRIM NUCLEAR POWER STATION

I. DELETED - REFER TO CALCULATION PS-32

J. CONSEQUENCES OF FIRE WITHOUT SUPPRESSION:
Safe Shutdown systems indicated in PS-32 are assumed to be available. Manual operator actions may be required to ensure shutdown system capability for a fire in this zone. Safe Shutdown procedures identify the specific actions to be taken to ensure shutdown.

K. CONSEQUENCES OF FIRE CONSIDERING MITIGATING FACTORS:
None

. CONCLUSION:
A fire that originates in this zone will not spread beyond Fire Area 1.9. Therefore, safe shutdown can be accomplished using " B" train Safe Shutdown systems.

M. COMMENTS:
None

N. SUMMARY OF ENGINEERING EVALUATIONS (EE's), EXEMPTION REQUESTS (ER's), OTHER COMMITMENTS:

ITEM	DESCRIPTION
ER #23	PNPS identified that some of the previously identified walls in Letter 2.88.120 had ratings less than 3 hours and desires to use the Engineering Evaluation process to substantiate lower ratings.
EE #1	Unprotected structural steel exists between Fire Zones 2.16 and 3.7 (corridor under Cable Spreading Room).
EE #5	Unfilled block walls exist in portions of wall barriers.

N. SUMMARY OF ENGINEERING EVALUATIONS (EE's), EXEMPTION REQUESTS (ER's), OTHER COMMITMENTS:

ITEM	DESCRIPTION
EE #10	Unprotected steel stairs in stairwell No. 8 and exposed sections of structural steel exist in Ready Room in the Control Room.
EE #14	The lack of a door in barrier across the Time Tunnel (Corridor 319) between Fire zone 1.27 and 2.16 is adequate.
EE #22	Lack of fire dampers in the ceiling of Corridor 319 (Time Tunnel).
EE #38	Justifies electrical box penetration configurations in Time Tunnel barriers.
EE #45	Fire barrier in an unfilled block wall with an embedded electrical penetration configuration.
EE #68	Acceptability of conduit through wall of CSR into Stairwell No. 8 and removable panel between CSR and " B" Switchgear Room.
EE #83	Acceptability of structural steel supporting Time Tunnel floor.
EE #95	Acceptability of cable tray penetration configuration in Appendix " R" wall barrier.
EE #98	Acceptability of cable tray penetration configurations in Appendix " A" wall barrier.
EE #106	Acceptability of unfilled block walls and various electrical penetration configurations in fire barriers.
FS&MC Memo 88-176	Certain structural steel members in wall fire barrier are not fireproofed.

Attachment 3 to Letter 2.09.071

Regulatory Commitment Summary

Regulatory Commitment	Implementation Date
Install Fire Detection in Stairway #8 (Fire Zone 2.16) in the area where safe shutdown cable is located at the 23' elevation	6 months after exemption approval date
Request Appendix R Section III.G.3 exemption for all fire zones crediting Alternate Shutdown and use low pressure systems for reactor inventory control for hot shutdown.	Submit Exemption prior to January 31, 2010