



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 23, 2009

Site Vice President
Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360-5508

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR EXEMPTION TO ALLOW
HOT SHUTDOWN MANUAL ACTIONS AT PILGRIM NUCLEAR POWER
STATION (TAC NO. ME0831)

Dear Sir or Madam:

By letter dated March 6, 2009, "Request for Exemption from Title 10 of the *Code of Federal Regulations* Part 50 (10 CFR 50) Appendix R Section III.G.2 to Allow Hot Shutdown Manual Operator Actions," Entergy Nuclear Operations, Inc. requested an exemption for the Pilgrim Nuclear Power Station from certain technical requirements of 10 CFR Part 50, Appendix R, Section III.G.2 (III.G.2) for the use of operator manual actions.

The Nuclear Regulatory Commission staff has been reviewing the submittal and has determined that additional information is needed to complete its review. The specific questions are found in the enclosed request for additional information (RAI). A response to this RAI is requested to be provided within 30 days.

Sincerely,

A handwritten signature in cursive script that reads "James Kim".

James Kim, Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-293

Enclosure:
As stated

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION (RAI) ON THE REQUEST FOR
EXEMPTION FROM 10 CFR PART 50, APPENDIX R, SECTION III.G.2 REQUIREMENTS TO
ALLOW HOT SHUTDOWN MANUAL ACTIONS AT PILGRIM NUCLEAR POWER STATION

By letter dated March 6, 2009, "Request for Exemption from Title 10 of the *Code of Federal Regulations* Part 50 (10 CFR 50) Appendix R Section III.G.2 to Allow Hot Shutdown Manual Operator Actions," Entergy Nuclear Operations, Inc. (Entergy) requested an exemption for the Pilgrim Nuclear Power Station (PNPS) from certain technical requirements of 10 CFR Part 50 Appendix R, Section III.G.2 (III.G.2) for the use of operator manual actions (OMAs) outside of the main control room in lieu of meeting the circuit separation and protection requirements contained in III.G.2 for Fire Zones 2.1, 2.2, 2.10, and 2.16, at PNPS.

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) staff's 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.

Enclosure

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-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-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.

For example:

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-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-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 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-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-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-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-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-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.

October 23, 2009

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James Kim, Project Manager
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