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

November 20, 2009

Mr. Charles G. Pardee
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNIT NOS. 2 AND 3: REQUEST FOR ADDITIONAL INFORMATION REGARDING REQUEST FOR EXEMPTION FROM 10 CFR 50, APPENDIX R, SECTION III.G, FIRE PROTECTION OF SAFE SHUTDOWN CAPABILITY (TAC NOS. ME0855 AND ME0856)

Dear Mr. Pardee:

By letter to the Nuclear Regulatory Commission (NRC) dated March 6, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090680141), Exelon Generation Company, LLC, (Exelon) submitted a Request for Exemption for Peach Bottom Atomic Power Station (PBAPS), Unit Nos. 2 and 3. The submittal seeks exemption from the provisions of Title 10 of *The Code of Federal Regulations*, Part 50 (10 CFR 50), Appendix R, Section III.G, "Fire Protection of Safe Shutdown Capability." The exemption requests the use of operator manual actions (OMAs) in lieu of the circuit separation requirements specified in 10 CFR 50, Appendix R, Section III.G.2 (III.G.2). The NRC staff has reviewed the request submitted by the licensee and has identified a need for additional information as set forth in the Enclosure.

The draft questions were sent to Mr. Glenn Stewart, of your staff, to ensure that the questions were understandable, the regulatory basis for the questions was clear, and to determine if the information was previously docketed. Draft question RAI-07 has been revised as indicated in the Enclosure. On November 13, 2009, Mr. Stewart indicated that the licensee will submit a response by February 12, 2010. Please note that if you do not respond to this letter by the agreed-upon date or provide an acceptable alternate date in writing, we may reject your application for amendment under the provisions of Title 10 of the *Code of Federal Regulations*, Section 2.108.

If you have any questions, please contact John Hughey at (301) 415-3204.

Sincerely,

John D. Hughey

John D. Hughey, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-277 and 50-278

Enclosure:
Request for Additional Information

cc w/encl: Distribution via ListServ

REQUEST FOR ADDITIONAL INFORMATION RELATED TO

REQUEST FOR EXEMPTION FROM 10 CFR 50, APPENDIX R, SECTION III.G,

FIRE PROTECTION OF SAFE SHUTDOWN CAPABILITY

PEACH BOTTOM ATOMIC POWER STATION – UNIT NOS. 2 AND 3

DOCKET NOS. 50-277 AND 50-278

By letter to the Nuclear Regulatory Commission (NRC) dated March 6, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090680141), Exelon Generation Company, LLC, (Exelon) submitted a Request for Exemption for Peach Bottom Atomic Power Station (PBAPS), Unit Nos. 2 and 3. The submittal seeks exemption from the provisions of Title 10 of *The Code of Federal Regulations*, Part 50 (10 CFR 50), Appendix R, Section III.G, "Fire Protection of Safe Shutdown Capability." The exemption requests the use of operator manual actions (OMAs) in lieu of the circuit separation requirements specified in 10 CFR 50, Appendix R, Section III.G.2 (III.G.2). The NRC staff has reviewed Exelon's submittal and determined that additional information, as described below, is needed to complete the review.

RAI-01 Circumstances for Review

Section II of the attachment[1] contains background information on the proposed OMAs but does not contain a technical justification for the application of special circumstances in accordance with 10 CFR 50.12. Since, according to Section II, it is the licensee's position that the protective measures prescribed by III.G.2 represent an unwarranted burden on Exelon and are not necessary to meet the underlying purpose of the rule, provide the relevant details to support this position in response to RAI-01.1 and RAI-01.2 below. The response should demonstrate that defense-in-depth is provided such that operators are able to safely and reliably achieve and maintain safe shutdown capability. Note that it is the NRC staff's position that OMAs 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-01.1: Provide a technical justification of how the proposed arrangement achieves the underlying purpose of the rule.

RAI-01.2: Provide an analysis that substantiates the claim of unwarranted burden and demonstrates that the hardship or other costs associated with the modifications

[1] Attachment to Exelon Generation Company, LLC original application dated March 6, 2009, (ADAMS Accession No. ML090680141), "Operator Manual Actions Exemption Request," herein referred to as "the attachment"

noted as being required to achieve compliance are significantly in excess of those contemplated at the time the regulation was adopted, or are significantly in excess of those incurred by others similarly situated.

RAI-02 Ensuring That One of the Redundant Trains Is Free of Fire Damage

Section II of the attachment asserts that the OMAs discussed in the request provide assurance that one train of systems necessary to achieve and maintain hot shutdown remains available in the event of a fire. Section II.C.1 contains a description of each of the OMAs and the time required to perform them but, does not state whether or how one of the redundant trains in a particular fire area is maintained free of fire damage. Section II.C.3 states that the analysis assumes that all potential fire damage identified for a fire area occurs instantaneously.

The method described in the request appears to demonstrate safe shutdown capability independent of the fire area of origin consistent with III.G.3, 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. The use of OMAs is not explicitly included as a means of compliance in 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.

RAI-02.1: Confirm and state whether an Exemption from III.G.2 requirements is the appropriate request, since safe shutdown capability is provided independent of the fire area of origin.

RAI-02.2: State 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.

RAI-02.3: Provide a summary of the plant-specific features that compensate for the lack of III.G.2-required features, identified in RAI-02.2, 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.

RAI-02.4: III.G.2 requirements provide defense-in-depth such that operators are able to safely and reliably achieve and maintain hot shutdown capability from the control room. Provide 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.

RAI-03 Other Evaluations

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

RAI-03.1: Provide a discussion of any other exemptions or evaluations that impact this request in any way and provide a justification for why such impact should be considered acceptable.

RAI-04 Standards and Listings for Systems and Barriers

Section II.B of the attachment 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.

RAI-04.1: 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.

For example:

- Section II.B.1 states that Fire Area 2 is equipped with a CO_2 system, pre-action sprinklers and wet pipe sprinklers. State whether these systems have been installed and maintained in accordance with a particular design standard or basis, e.g. National Fire Protection Association 13: "Standard for the Installation of Sprinkler Systems," 1985 Edition.

- Section II.B.2 states that Fire Area 4 is equipped with full area smoke detection that actuates a pre-action sprinkler system. 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.

- Section II.B.4 states that Fire Area 6S is subdivided into various rooms and floors by heavy concrete 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. Also state whether fire areas are separated from adjacent fire areas and the rating and integrity of such barriers.

- Section II.B.4 states that Fire Area 6S has a water curtain type open head sprinkler system installed along the west side of the reactor building. State whether this system has been installed and maintained in accordance with a particular design standard or basis, e.g. National Fire Protection Association 13: "Standard for the Installation of Sprinkler Systems," 1985 Edition, and how it is activated

RAI-04.2: 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.

RAI-04.3: Provide a technical justification for any non-rated fire protection assemblies.

RAI-05 Time and Sequence Assumptions

Section II.C.3 of the attachment states that the analysis assumes that all potential fire damage identified for a fire area occurs instantaneously at the point of plant shutdown and that a 30-minute diagnosis time has been assumed for the OMAs except for those classified as "prompt." Section II.C.1 contains a discussion of the amount of time required to perform the OMAs verses the time available. This section also indicates that margins of safety range from 6 minutes to 113 minutes.

The request lacks a detailed description of the series of events that may occur prior to initiating the OMA procedures. For example, Section II.B states that Action C is a prompt action, which is comprised of a series of 6 tasks. This section goes on to state that Action C requires 15 minutes to perform with an assumed available time of 25-minutes but does not describe whether the procedure is initiated immediately upon activation of the fire detection system in Fire Area 2, or upon confirmation of a fire in that area, or upon some other form of indication. For this example, if the operators were to take more than 10 minutes to diagnose or confirm the fire and begin the procedure and the redundant components were damaged upon the onset of the fire, the total time to complete the procedure would exceed the 25-minute time limit. Therefore, sufficient time would not be available to assure safe shutdown.

RAI-05.1: Considering that a 30-minute diagnosis time is assumed for the non-prompt actions to account for challenges, unknowns, or delays, provide a justification that similar challenges are adequately accounted for in the "prompt" action timelines.

Section II.C.3 states that operators will know a fire condition exists from the onset of the event and that they will be aware of the location and size of the fire based on reports from the fire brigade.

RAI-05.2: 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.

RAI-05.3: Please 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 coincident to or 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 II.B of the attachment includes a description of the combustible fuel load in each of the fire areas in question and rates them as LOW, MEDIUM or HIGH. Items such as cable insulation, lube oil, silicon rubber and Class A materials are stated as being present in many of the fire areas.

RAI-06.1: 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., 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.
- Dimensions of the rooms including ceiling heights.

RAI-07 Fire Area Proximity and Access

Section II.B of the attachment describes each fire area and includes statements about the nature and/or rating of the fire area boundaries. However, Section II.B does not mention whether openings and penetrations exist and maintain the integrity of the rated barriers. The fire rating of the barriers is also not stated. Section II.C.1 does note that many of the fire areas have separate ventilation systems but does not discuss how and when these systems activate and whether they have been designed to transport products of combustion without causing additional damage to equipment or relocating the smoke to other fire areas.

RAI-07.1: For adjacent fire areas or where operators will pass within close proximity of the fire affected 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.

RAI-07.2: State whether identified ventilation systems are used for smoke evacuation or fire brigade operations and provide a justification for the systems' capabilities.

RAI-08 Fire Scenarios

Section II.C.1 of the attachment describes each of the OMA procedures but does not state what fire scenarios have been considered for the postulated events. Also, the request includes discussions of equipment that may be available, but does not include a discussion of whether that equipment would be affected by the postulated events.

For example: For Fire Area 50, no information is provided to describe the spatial relationship between the combustible materials (i.e. cables, lube oil, thermo-lag etc.) and the safe shutdown equipment located in the fire area. Also, missing is a discussion of the relationship between the

two redundant trains in the area and whether they are located such that a single fire event could damage both buses.

Note that these questions are distinct from the RAI addressing Ignition Sources and Combustible Loading (RAI-06), which is generally focused on the combustibles in an area, whereas, this RAI addresses the specific relationship between ignition sources, combustibles and the redundant trains or other equipment that may be useful in assuring safe shutdown.

RAI-08.1: 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.

RAI-08.2: Provide a discussion of equipment that may be available and would provide an additional margin of safety. For example, in the description for Action A, the allowable time is based on no high-pressure injection sources being available. The response for Action A to this RAI should include a discussion of the fire scenarios that would cause failure of the high-pressure injection sources for the postulated fire scenarios.

RAI-09 Travel and Performance Time Calculation

RAI-09.1: Section II.C.1 of the attachment states that Action U requires 8 minutes travel and performance time for restoration of a single bus and that there are a total of four buses to be restored. This would result in a total of 32 minutes (4 x 8) for the travel and performance time but the request states 26 minutes. The same mathematical statement is made for Action V. Confirm how much time has been assumed for restoring the buses and provide the correct calculation.

RAI-09.2: For Action GG, it is noted that the action requires the operator to obtain and use a plug-in test switch located outside the control room but does not state whether this time has been accounted for in the performance time. State whether this time is included in the 7-minute travel and performance time and state the total time required to perform the action.

RAI-10 Fire Retardant Insulation

Section II.B.1, et al, of the attachment states that all exposed cables have fire retardant insulation, but does not describe the quality or certification of the fire retardant insulation.

RAI-10.1: Provide a description of the relevant technical information regarding the performance of the insulation and the technical basis for it being considered fire retardant. For example, include cable jacket and insulation construction, thermoset or thermoplastic; standards (IEEE 383, or others); and the manufacturer, product name, installation standard, and deviations from the standard (for applied coating), if applicable.

In addition, Fire Area 26 is described as having cable insulation, but not fire retardant insulation.

RAI-10.2: Provide a detailed description of the different types of cable insulation used for different fire areas.

RAI-11 Total Estimated Time

Section II.C.2 of the attachment provides a series of tables that summarize the OMAs that are performed in each fire area; however, these tables appear to indicate different total estimated time durations from what were provided in Section II.C.1. Specifically, it is not clear whether the 30-minute diagnosis time is included in the total estimated time or whether operators proceed to perform other activities once their initial tasks have been completed.

For example, a fire in Fire Area 57 (page 45 of the attachment) appears to require a single operator to perform multiple tasks as part of a sequence of tasks, but does not describe whether the individual operators will proceed to the next task once the first task is completed. For instance, it is not clear whether Operator 1 will continue to their second task after the assumed 12-minute estimated time. It is also not clear whether the estimated and/or allowable times are additive. Operator 1 is responsible for a 12-minute task, a 5-minute task and a 110-minute task but the allowable time is noted as being 150 minutes. This would result in a safety margin of 23 minutes or a 7-minute deficiency, if a 30-minute diagnosis time is needed.

RAI-11.1: Elaborate on what the 30-minute diagnosis time has been assumed to account for and whether it has been included in the total estimated time for all of the non-prompt OMAs in the request. Also, indicate whether any diagnosis time has been accounted for in the prompt action estimated times or why diagnosis time is not necessary.

RAI-12 Identification and Uniqueness of OMAs

Section II.C.1 of the attachment describes Actions A through GG and Section II.C.2 contains tables indicating the fire areas for which the OMAs would be necessary, however, it is not clear which fire areas the OMAs are located in.

RAI-12.1: Provide a description that includes the fire area of origin, fire area containing the OMA, total estimated/calculated performance time and allowable time for each of the OMAs in the request.

If you have any questions, please contact John Hughey at (301) 415-3204.

Sincerely,

/ra/

John D. Hughey, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-277 and 50-278

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