



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

October 20, 2009

Mr. Charles G. Pardee  
President and Chief Nuclear Officer  
Exelon Generation Company, LLC  
200 Exelon Way  
Kennett Square, PA 19348

SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION - REQUEST FOR  
ADDITIONAL INFORMATION REGARDING SECONDARY CONTAINMENT  
OPERABILITY LICENSE AMENDMENT REQUEST (TAC NO. MD7261)

Dear Mr. Pardee:

By letter to the Nuclear Regulatory Commission (NRC) dated November 2, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073180397), as supplemented by letters dated May 5, July 3, and September 22, 2008 (ADAMS Accession Nos. ML081330320, ML081930802, and ML082670773, respectively), Exelon Generation Company, LLC (Exelon), submitted a license amendment request. The proposed change would revise operability requirements associated with secondary containment operability during refueling. 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.

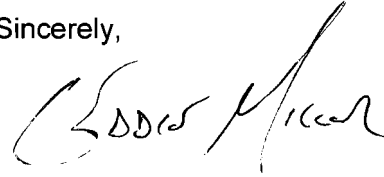
The draft questions were sent via facsimile on September 11, 2009 (ADAMS Accession Nos. ML092540236 and ML092540545), to Mr. Richard Gropp, of your staff, to ensure that the questions were understandable, the regulatory basis for the question was clear, and to determine if the information was previously docketed. The questions were discussed in a public meeting held on September 29, 2009. On October 9, 2009, Mr. David Helker, also of your staff, indicated that Exelon would be able to respond by November 16, 2009. 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.

C. Pardee

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If you have any questions, please contact me at (301) 415-2481.

Sincerely,

A handwritten signature in black ink, appearing to read "G. Edward Miller". The signature is fluid and cursive, with a large initial "G" and a long, sweeping line extending from the end.

G. Edward Miller, Project Manager  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosure: Request for Additional Information

cc: Distribution via ListServ

REQUEST FOR ADDITIONAL INFORMATION  
REGARDING LICENSE AMENDMENT REQUEST  
SECONDARY CONTAINMENT OPERABILITY  
OYSTER CREEK NUCLEAR GENERATING STATION  
DOCKET NO. 50-219

By letter to the Nuclear Regulatory Commission (NRC) dated November 2, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073180397), as supplemented by letters dated May 5, July 3, and September 22, 2008 (ADAMS Accession Nos. ML081330320, ML081930802, and ML082670773, respectively), Exelon Generation Company, LLC (Exelon), submitted a license amendment request (LAR). The proposed change would revise operability requirements associated with secondary containment operability during refueling. The NRC staff has reviewed Exelon's submittal and determined that additional information, as described below, is needed to complete the review.

1. In the November 2, 2007, submittal, Attachment 2, Table 1, "Conformance with Regulatory Guide (RG) 1.183 Main Sections," states that the submittal "conforms" to Regulatory Position 5.1.2 and that "[t]he analysis takes no credit for safety related features." Later correspondence contained in calculation C-1302-822-E310-082, Revision 1, continues to state conformance to RG 1.183.<sup>1</sup>

Regulatory Position 5.1.2 states:

Credit may be taken for accident mitigation features that are classified as safety-related, are required to be operable by technical specifications, are powered by emergency power sources, and are either automatically actuated or, in limited cases, have actuation requirements explicitly addressed in emergency operating procedures.

In the September 22, 2008, response to a Request for Information, Exelon stated:

AmerGen [Exelon] will update the UFSAR [Updated Final Safety Analysis Report] to include the acceptable secondary containment penetrations and openings that could be breached/opened while moving irradiated fuel with sufficient decay . . . Any additional penetrations and openings not included in the UFSAR (as outlined in Table 1 below in response to NRC Question 2)

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<sup>1</sup> According to calculation, C-1302-822-E310-082, Revision 1: 1) "This calculation determines the safety features required to assure that regulatory limits in 10CFR50.67 are met, and is performed in conformance with guidance for analysis of this event provided in Regulatory Guide (RG) 1.183, Appendix B." 2) "Dose models for both onsite and offsite are simplified and meet RG 1.183 requirements," and 3) "This analysis uses Alternative Source Term (AST) assumptions per guidance in RG 1.183."

ENCLOSURE

must be analyzed in accordance with applicable regulatory requirements (i.e., 10CFR50.59) before relaxation of secondary containment requirements for movement of irradiated fuel with sufficient decay. The method of evaluation used will demonstrate that radiological consequences associated with the Fuel Handling Accident (FHA) do not exceed applicable regulatory dose limits.

Based upon the above, the statement that, "[t]he analysis takes no credit for safety related features," and the stated conformance to Regulatory Position 5.1.2 appear to be inconsistent. By proposing a limited number of acceptable penetrations and openings that can be breached, Exelon credits the capability of any remaining secondary containment accident mitigation features as being capable of performing their safety functions for the analyzed conditions for the duration of their mission times.<sup>2</sup> However, the licensee's proposed technical specification (TS) changes remove all requirements for all secondary containment accident mitigative features after 24 hours. Instead, Exelon proposes that the secondary containment mitigative features are to be established in the UFSAR. Exelon's proposed deletion of TSs associated with secondary containment operability and incorporation of controls in the UFSAR is not consistent with Regulatory Position 5.1.2. In accordance with 10 CFR 50.36, "Technical specifications," Exelon's proposed continued reliance on some safety-related features of secondary containment to function or actuate to mitigate a design-basis accident necessitates their inclusion in the TSs.

The TSs proposed in the original LAR, which were not amended in the July 3, 2008, supplement or the September 22, 2008, RAI response, are insufficient for the NRC staff to find that the licensee has provided the lowest functional capability or performance level of equipment for safe operation of the facility that would provide reasonable assurance that, in the event of an FHA when secondary containment is INOPERABLE, the dose consequences will meet NRC regulatory requirements.

Therefore, the NRC staff requests that the licensee provide revised TS changes, consistent with its proposed revised analysis of record, that ensure the lowest functional capability or performance level of equipment credited for functioning or actuating to mitigate the design basis fuel handling accident.

2. In NRC Regulatory Issue Summary 2006-04, "Experience with Implementation of Alternative Source Terms," the NRC reiterated its regulatory position that "Licensees are responsible for identifying all release pathways and for considering these pathways in their AST analyses, consistent with any proposed modification." During the course of the review, which includes its supplements and RAI responses, the licensee has provided three separate lists of analyzed or considered release points and pathways. In reviewing these lists, the staff has identified variations that raise concerns regarding

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<sup>2</sup> Per page 14 of calculation C-1302-822-E310-082, Revision 1 several structures and components are part of the primary success path and function to mitigate the Fuel Handling Accident. Specifically, Exelon states that the Commodities Penetration on the RB North Wall, MAC Facility Personnel Airlock, MAC Facility Entrance, Trunion Room Door to Turbine Building are credited in the analysis.

whether the licensee has analyzed all potential release points and pathways to ensure that regulatory dose limits would be met in the event of an FHA. Consistent with NRC's established regulatory position, the NRC staff requests that the licensee provide a comprehensive list of all analyzed and unanalyzed secondary containment potential release points and pathways to the environment and control room. These pathways should include those pathways to adjacent buildings that could lead to the environment or to the control room (i.e. Secondary Containment HVAC ductwork, structural openings etc.). Additionally, the licensee's evaluation of the pathways should consider the effects of operability or inoperability of other safety systems such as the Secondary Containment Isolation Valves and Standby Gas Treatment System (SGTS). For each potential release point or pathway, the licensee should provide the following:

- a. The results of its dose analysis demonstrating that 10 CFR 50.67 regulatory limits are met;
- b. If a dose analysis has not been performed, a technically sound basis for why this release point or pathway is bounded by other analyzed release points; and
- c. An explanation for how the existing proposed TS changes or, as necessary, new revised TSs will ensure that the dose limits are met.

3. In Table 4-3, "Parameters Applicable to AST Fuel Handling Accident Dose Considerations for Oyster Creek Nuclear Generating Station," of the July 3, 2008, supplement, Exelon states that no credit is taken for filtration by the SGTS. However, in the same supplement, Exelon provides a commitment to provide "... prompt methods... to enable ventilation systems to draw the release from a postulated fuel handling accident in the proper direction such that it can be treated and monitored." This appears to be a reference to the SGTS. Based on the proposed TS changes from the original LAR, it does not appear that the SGTS will be required to be operable during non-recently irradiated fuel handling operations (i.e., after the reactor has been subcritical for 24 hours). As such, it would not be available for performing the safety function described in the commitment. With the SGTS inoperable, the licensee would be unable to create the differential pressure inside the secondary containment necessary for the purposes of directing the radioactive release from a fuel handling accident through the SGTS filtration and the Main Stack. As such, other potential release points or pathways, such as smaller secondary containment penetrations and pathways the licensee has determined must remain closed even after 24 hours of decay time, that have not been analyzed or considered may become relevant dose contributors. Therefore, the NRC staff requests the licensee provide the following information:

- a. An analysis demonstrating that the SGTS can perform its safety function under all possible plant configurations related to secondary containment operability during fuel handling operations. This analysis should consider the potential impacts of differential pressures caused by local wind conditions.
- b. Appropriate TS related to SGTS operability during periods when it is credited for performing a safety function related to the mitigating the consequences of an FHA.

4. Based on the differences identified between the licensee's analyses and its statements regarding conformance with Regulatory Position 5.1.2 discussed in question #1, the NRC staff requests that the licensee reevaluate its conformance with Regulatory Position 5.1.2 and provide additional justification that all credited accident mitigation features are classified as safety-related, are required to be operable by TSs, are powered by emergency power sources, and are either automatically actuated or, in limited cases, have actuation requirements explicitly addressed in emergency operating procedures.

5. Exelon has proposed the following commitment in the July 3, 2008, supplement:

Plant procedures will continue to require that secondary containment integrity be maintained when handling heavy loads (greater than one fuel assembly), such as the reactor vessel head or dryer/separator assembly, over the reactor cavity with fuel in the reactor vessel.

Currently, TS requirements 3.5.B.1.c, 3.5.B.1.d and 3.5.B.1.e (consistent with 10 CFR 50.36, Criterion 3) exist to require secondary containment integrity when heavy loads could cause a release of radioactive materials (i.e. reactor vessel head is on, operations are not being performed in, above, or around the spent fuel pool that could cause release of radioactive materials, etc.). Exelon proposes to delete or modify these TS requirements. However, the licensee has not provided a technical justification for why these controls are no longer required to account for an FHA resulting from the potential drop of a heavy load. Such an accident has the potential to result in greater fuel damage and radioactive release than that assumed in the license amendment. As such, the NRC staff request that the licensee provide a technical justification for why these limiting conditions for operation are not required to establish the lowest functional capability or performance levels for equipment required for safe operation of the facility (in accordance with 10 CFR 50.36) for movement of heavy loads over the reactor cavity or spent fuel pool.

6. In the November 2, 2007, submittal, Section 2 provides the proposed changes. No justification is provided for the change labeled 2.4 and additional justification is needed for changes 2.3, 2.5, 2.6 and 2.8. Many of the proposed changes cite a conformance with TSTF-51, Rev. 2 as the justification. However, the licensee's subsequent revisions to the original LAR reduce its consistency with TSTF-51, Rev. 2. Therefore, the NRC staff requests that the licensee provide further detailed justification for each proposed change.

Note: The NRC staff recognizes that the licensee's response to the RAIs above may result in significant changes to the TSs proposed in the November 2, 2007, submittal. Substantial changes could invalidate or render moot the original justification for the proposed changes. In that case, the NRC staff encourages the licensee to completely revise Section 2.0, "Proposed Changes" and submit a new Section 2.0 which includes a clear technical justification for each proposed change.

7. In its amendment request, Exelon assumed that all radioactivity will enter the control room through the HVAC intake ductwork. However, no technical basis for that assumption was provided. The NRC staff requests that the licensee provide a justification for this assumption. As part of its justification, the staff requests that the licensee reevaluate whether release pathways exist from the secondary containment into buildings connected to the control room. If such pathways exist, the staff requests that the licensee justify why the atmospheric dispersion factors used in its analysis are limiting. Finally, the staff requests that Exelon provide scale drawings showing the relationship of the secondary containment to the control room.
8. The NRC staff requests that the licensee explain how the monitoring of radioactive releases resulting from an FHA or "inadvertent release of radioactive material" (GDC 63 and 64) will be accomplished with the secondary containment open. The current licensing basis for Oyster Creek assumes the secondary containment is operable during fuel handling operations and by extension would be operable during an FHA or an "inadvertent release of radioactive material." As such, any radiation monitoring and filtering equipment inside secondary containment would have been designed, located, and calibrated based on the current design and licensing basis. The proposed changes could impact the effectiveness of that monitoring equipment. For example, the timing of proceduralized operator actions related to indications or alarms from this equipment could potentially be delayed or prevented by a reduced effectiveness of this equipment. The staff believes the ability to effectively monitor the radioactive release is critical to the protection of the public and plant personnel.
9. Regulatory Guide 1.194, "Atmospheric Relative Concentrations for Control Room Habitability Assessments at Nuclear Power Reactors," states that:

Diffuse source modeling should be used only for those situations in which the activity being released is homogeneously distributed throughout the building and when the assumed release rate from the building surface would be reasonably constant over the surface of the building.

The release from the reactor cavity and spent fuel pool is to the area in the reactor building that is above elevation (El.) 119'-3". The reactor building is constructed entirely of reinforced concrete to the refueling floor level at El. 119'-3". Above the refueling floor, the structure is steel framework with insulated, corrosion-resistant metal siding. Because of the differences in construction, leakage appears to be more likely from the secondary containment above the refueling floor than from the secondary containment below the refueling floor. Therefore, the NRC staff requests that the licensee justify the use of the entire exposed area of the reactor building for calculation of the reactor building diffuse source rather than using only the area of the building above the refueling floor where the materials of construction would be more likely to have release pathways to the environment. Additionally, the staff requests that the licensee provide a technical basis for its assumption that the activity being released will be homogeneously distributed throughout the building and that the release rate from the building surface will be reasonably constant over the surface of the building.

10. Are any non-safety related systems and components credited in the alternate source term analyses? If so:
  - a. Describe how this system will be electrically separated from the safety-related system (provide a detailed discussion on how a fault on the non-Class 1E electrical circuit will not propagate to the Class 1E electrical circuit).
  - b. Describe the independence (e.g., electrical and physical separation) and redundancy of these systems.
  - c. Describe how these systems meet the single failure criterion.
  - d. Describe how the operators will be notified in the event that these systems and components would become inoperable (e.g., control room annunciators).
  - e. Describe any impacts on seismic qualifications of these systems and components.
11. Are any loads being added to the Oyster Creek emergency diesel generators (EDGs)? If so, describe how the loads being added to the EDGs affect the capability and capacity of the EDGs (e.g., describe the impact of the proposed change on the EDG ratings).
12. Provide the loading sequence for each EDG at Oyster Creek. In your response, describe the changes that have been made to the EDG loading sequence to support this LAR.
13. Provide a list and description of components being added to your 10 CFR 50.49 program due to this LAR. Confirm that these components are qualified for the environmental conditions they are expected to be exposed to.
14. Are there any changes in the chemical composition of the chemical spray solution as a result of this LAR? If so, provide the chemical composition and provide a detailed evaluation to show the components are qualified for the environmental conditions they are expected to be exposed to. Also, describe, if any, changes in the operation of the chemical spray system and its impact on the environment.
15. Confirm that Oyster Creek environmental qualification (EQ) analyses will continue to be based on Technical Information Document (TID)-14844, "Calculation of Distance Factors for Power and Test Reactor Sites" in the EQ program. Otherwise, provide the EQ analyses to support this LAR.



C. Pardee

- 2 -

If you have any questions, please contact me at (301) 415-2481.

Sincerely,

/ra/

G. Edward Miller, Project Manager  
Plant Licensing Branch I-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosure: Request for Additional Information

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